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DIESEL RAILWAY TRACTION SUPPLEMENT

The October issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price 1s.

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

NOTICE TO SUBSCRIBERS

Consequent on further paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list which will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and facilities for such dispatch.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

REDUCTION IN SIZE OF PAGE

To economise in paper our readers will observe a slight reduction in the size of THE RAILWAY GAZETTE in that the size of the page has been reduced from 9 in. x 12 in. to 8½ in. x 11½ in. The type area of the page remains the same, namely, 7 in. x 10 in., but the surrounding margins have been reduced. This of course detracts from the appearance of the paper, but is one of the exigencies of the war

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:

Mondays to Fridays 9.30 a.m. till 5 p.m.

The office is closed on Saturdays

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Personnel for Overseas Trade

SOME constructive recommendations are made in a memorandum which has been issued by the Association of British Chambers of Commerce on the education and training of personnel for overseas trade. It is a matter which in the post-war years will be of primary importance in the re-establishment of British industry, and it is one which cannot be investigated and developed too soon. The association takes the view that during perhaps three years or more between the cessation of hostilities and established peace, there will be a great demand for products of all kinds from all countries. It goes on to outline a scheme which it claims would ensure redirection from war proficiency to peace efficiency, and would provide the source from which to draw personnel to equip the nation's export trade. It urges that by a process of scientific selection for aptitude and potential capacity a "merchant corps d'élite" equipped both technically and in the intangibles of commercial behaviour would while acting for their firms, at the same time sustain the prestige of the country. In the past it is an unfortunate fact that in many cases British undertakings have been too concerned to obtain their foreign sales representation at the cheapest possible price and have paid on the whole lower salaries than those dispensed by competing countries. Not only this, but the Government itself has adopted a cheese-paring policy as to its expenditure in its commercial representation abroad, and the association urges that after the war Government commercial representatives should in no way be placed at a disadvantage in relation to those of the country's principal competitors. The more progressive British industries have already in mind some of the difficulties which will have to be encountered after the war, and wherever it is possible to devise plans, which at this stage must necessarily be tentative, every encouragement should be afforded.

■ ■ ■

Security of Service Information

We have been requested to draw the attention of those who have dealings with members of H.M. Forces to the importance of safeguarding Service information which they may possess. Of necessity, transport undertakings and many manufacturers obtain in the ordinary course of their business Service information relating to the names of Units and their locations and movements. Often the location of an individual Unit will be widely known and may not be of great importance, but the information about the locations of many Units could be of considerable value to the enemy and might be secured by a careful collation of items which individually are not vital. Any lists of Service addresses, or correspondence from which such lists could be compiled, should therefore be safeguarded from falling into unauthorised hands and should be kept in a locked receptacle. Moreover, the locations and movements of troops should not be discussed on the telephone. In Canada, imperative instructions have been issued by the Department of National Defence that no information regarding movements of troop trains may be issued by the railway companies. By reason of the long distances traversed by the Canadian railways, individuals often enquire from the railway companies about relatives and friends who are believed to have reached Canada and to be travelling homeward. Great disappointment is often experienced when they are refused information, but the rigid rule imposed by the Canadian Department of National Defence is considered essential as a contribution to general security.

■ ■ ■

London Transport Stock Conversion

Redemption of the £12,583,000 of London Transport 4½ per cent. "T.F.A." stock, 1942-72, of which the principal and interest are guaranteed by the Treasury under the Trade Facilities Acts, 1921 to 1926, has now been carried a step further by the notice of a new issue offered in exchange. In April last the Treasury had agreed, subject to the necessary Parliamentary powers being granted, to the issue by the board of stock of a new class which would have the same ranking as the existing "T.F.A." stock, with a similar guarantee by the Treasury, but carrying a lower rate of interest, which would be determined by the board, with the approval of the Treasury. Parliamentary powers for the creation of the new stock were given by the London Passenger Transport Act, 1942, which received the Royal Assent on July 29. As previously announced the entire outstanding "T.F.A." stock will be repaid at par on January 1 next at the Bank of England. The new stock into which "T.F.A." holdings may be exchanged is to be called London Transport 3 per cent. guaranteed stock, 1967-72. It will be issued at the price of £97 10s. per cent. with a cash payment of £2 10s. for each £100 of stock surrendered. Further regulations have now been made by the Minister of War Transport modifying the provisions of the London Transport Stock Regu-

lations, 1933. The principal amendments are the abolition of the right to have any of the stock of the board inscribed and the inclusion of certain provisions for matters of detail in connection with the forthcoming redemption of the "T.F.A." stock. "T.F.A." 4½ per cent. stock not exchanged into the new issue will be redeemed in cash on January 1, 1943, and a full month's interest (less tax) on this stock will be paid on that date. Interest on the new 3 per cent. guaranteed stock will be payable half-yearly on January 1 and July 1. The first payment, being a full six months' interest (less tax), will be made on July 1, 1943. Holders of "T.F.A." 4½ per cent. stock who wish to exchange into the new issue must signify their acceptance of the offer before November 18 next.

Overseas Railway Traffics

For the 11th and 12th weeks of the current financial year the British-owned railway companies in Argentina show advances in traffics, with the exception of the Buenos Ayres Western, which has a decrease of £4,920 in that period. The sterling advances in the two weeks are:—Buenos Ayres & Pacific £37,500, Central Argentine £23,355, Buenos Ayres Great Southern £19,560, Entre Ríos £5,424, and Argentine North Eastern £4,332. At the end of the 12th week a year ago increases on the corresponding period of 1939-40 were:—Central Argentine £264,495, Buenos Ayres & Pacific £133,320, Buenos Ayres Western £112,620, and Buenos Ayres Great Southern £101,640. After a few weeks of decreases the Central Uruguay shows a small increase for the 12th week, which reduces the aggregate decrease to £22,323, or £165,666.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific*	12th	93,000	— 20,700	991,680	— 58,620
Buenos Ayres Great Southern*	12th	142,920	+ 9,000	1,480,320	+ 15,720
Buenos Ayres Western*	12th	51,540	— 4,260	571,980	— 16,140
Central Argentine*	12th	129,843	+ 13,053	1,440,639	+ 157,323
Canadian Pacific	... 38th	1,053,800	+ 138,200	36,017,400	+ 5,531,200

* Pesos converted at 16½ to the £

United of Havana traffics have again advanced substantially, bringing the aggregate increase for the year to date to £220,444. Leopoldina Railway earnings for the first 38 weeks of the present year amount to £1,131,351, an increase of £161,744, and the Great Western of Brazil Railway total for the same period shows an improvement of £40,300.

Indian Railways Prepare for Hostile Air Attack

On another page of this issue we publish extracts from the official *Gazette of India* briefly describing the organisation and regulations laid down for the Indian Railway Air Raid Precautions Service. Much of the text has a familiar ring in it, but there are some points of interest apart from the cut-and-dried comprehensiveness of the *Gazette* notification. For instance, the fact that persons other than railway servants can be enrolled in the various sub-services—albeit with special declaration forms and terms of resignation—is unusual. Probably this is due to the existence of large railway colonies, sometimes with populations of 15,000 to 20,000, in which it is advantageous to recruit non-railway members of families and possibly women for first-aid work. The regulations forbidding communication with the press or any political organisation as to matters connected with A.R.P. duties are particularly noteworthy and essential in India, as is also the warning that information conveyed in reports must be treated as strictly confidential. The Bomb Reconnaissance & Confirmation Service is also unusual in that, though it presumably takes the place of at any rate part of the duties of a Bomb Disposal Unit, it is a civilian sub-service of the A.R.P. organisation. The whole notification clearly shows how much alive Indian railways are to the necessity for having a fully organised A.R.P. service in being, to counter any "hostile attack made from the air or otherwise," though the significance of the last two words is not immediately apparent, unless they imply bombing by quislings.

Hand Book of Stations

The first book giving a list of stations on the systems of the various British railway companies was compiled and published in 1862 by Henry Oliver and John Airey of the Railway Clearing House at 101, Seymour Street, Euston Square, London. The size was 8 in. x 5 in., and it consisted of 33 pages showing the station, company, and position. Various editions followed, each improved and added to, until 1895. The book then showed the

additional matter of station accommodation, crane power, and county. The Railway Clearing House then purchased the goodwill and stock from Mr. John Airey, and the staff of the Distances Department took over the business of selling the 1895 edition, together with the various railway maps. After an exhaustive preparation by the Distances Staff, the first Clearing House Official Edition was published in 1904; it was quarto size, and consisted of 600 pages. This was sold to the companies and to trading firms all over the country. An appendix was printed in 1910. Another edition appeared in 1912 of 680 pages and at this time, through the Goods Managers Conference, quarterly leaflets were circulated giving additions and alterations to the book as they occurred. The war of 1914-19 intervened, and later the companies were amalgamated into groups. The 1925 edition showed the group companies only, but this was found to be inadequate, so another edition appeared in 1929 with the constituent company shown as well as the group company. The current issue of 14,000 copies is dated 1938, and has been altered in size to 11½ in. x 7½ in. It consists of 654 pages with some 50,000 entries of stations, halts, junctions, sidings, collieries, and works in Great Britain and Ireland, with their railway, county, position, the station accommodation for goods, passengers, furniture, livestock, horses, carriages, and motor-cars, and the maximum crane power available. In peacetime there is a large public for the book, which is sold at 10s. 6d., and a strongly bound edition with interleaved pages for insertion of rates is published at 45s. The staff of the Distances Department is responsible for the compilation and sales of the book, appendices, and leaflets; the last-named are now issued every 4 months, as a war measure, but formerly they appeared every 2 months.

Old Railway Inventions Revived

Many who study locomotive design and more particularly some of those not actually associated in a practical manner with the subject are apt to look on many of its features as belonging almost entirely to the practice of the past few decades. More experienced investigators and practitioners, however, realise that some at least of present-day characteristics go back very much further than that. Such features of construction as piston valves, combustion chambers, feedwater heaters, thermic syphons, and soot blowers, for instance, were known to, and indeed used by, some of the early locomotive engineers in this and other countries, not perhaps in the precise form associated with their modern counterparts, but embodying the same characteristics of design and operating in accordance with the same fundamental principles. The article on page 324 of this issue deals with this interesting subject and shows by means of illustrations and descriptions that Stephenson designed piston valves for locomotives in 1832 and that other well-known locomotive engineers did the same in the engines they built in the '70's. Joseph Beattie, when locomotive superintendent of the London & South Western Railway, used combustion chambers equipped with a form of thermic syphon and so planned the firebox that two firedoors had to be provided in place of the usual one. McConnell before this had added mid-feathers to the firebox of some of his engines, thus making duplicated firedoors necessary, and he also used combustion chambers and feedwater heaters, the latter located in the smokebox; again, F. W. Webb in 1891 in his "Greater Britain" locomotives employed combustion chambers fitted with a soot-blowing device.

Compressed Air Plant

Large quantities of compressed air are used in nearly every modern factory or workshop but only at long intervals does the subject of plant for compressing it come up for discussion at institution meetings. Of all the more interest and value therefore is a recent publication of the Diesel Engine Users Association embodying a paper entitled "The Internal Combustion Engine Driven Air Compressor" by Mr. A. K. Bruce, M.I.Mech.E., Mem.A.S.M.E., and the written discussion upon it. Though the emphasis in the title is upon the internal combustion engine method of driving, the paper itself, and more especially the discussion, is largely concerned with air compressors pure and simple, and the information given is as valuable to engineers with electrically-driven compressors as to those who are contemplating diesel power. Figures are given for the quantities of cooling water and lubricant required, and consideration is given to the quality of both. The very real danger of using unsuitable oils, or an excessive amount of any lubricant, is shown, as also are the probable consequences of using paraffin instead of soap suds for cleaning during overhauls. A very clear case is made for efficient air filtration; over half a ton of dust particles are liable in one year to enter a compressor of 2,000 cu. ft. a minute capacity working with air that would normally be considered

fairly clean. Both felt and viscous type filters are in common use and they offer a resistance to airflow of from 6 to 8 mm. of water gauge.

At Government Rates

There is one class of traveller to whom the question whether his journey is really necessary sounds particularly relevant. We refer to the members of the Services in transit from camp to camp. He wakes one day to find that the authorities who a short time ago found his absence unendurable if he returned from leave at 0002 hr. instead of 2359 hr., are suddenly obsessed with the desire to be rid of him as soon as possible. He is even provided with transport to the railway station, though not always with much reference to whether his arrival there coincides with a convenient train to his new home. If he begins to enjoy a feeling of virtue at being one of the few travellers who is presumably welcomed by the railways and the Government, it is quickly dispelled when he reaches his destination and finds that he is not expected. The familiar slogan about the necessity of journeys then recurs to him, until he is almost betrayed into questioning the wisdom of higher authority. A safer course is for him to assume that all postings are the work of a demented clerk in Whitehall selecting names from the London Telephone Directory and sending their owners to destinations found in the index of a ten-year-old *Bradshaw*.

Locomotive Superheating History

WHEN superheating is discussed by locomotive engineers, they naturally consider it as applied to the steam locomotive, but as was pointed out by Mr. R. S. York in a paper that he read on the subject at a meeting of the Institution of Locomotive Engineers at Sydney, New South Wales, this is only one way in which superheating is now employed for motive power on many of the principal railway systems of the world, for, with the increasing use of electric traction, the superheating field has been extended to the large stationary power-generating plants where very much higher pressures and temperatures are in use than generally are found in locomotive practice. The author, although he confined his paper to the more practical side of the subject, made some interesting references at the outset to the history of superheating. The first British patent covering a locomotive superheater was taken out by Richard Trevithick in 1832, and was applied to what in effect was a vertical water-tube boiler, and the earliest British patent showing a smoke-tube superheater was granted to John Henry Johnson in 1855. Between 1832 and 1870 numerous superheating devices were brought out, but due to troubles with valves, packing, and lubrication, superheating on steam locomotives was more or less abandoned until the researches of Dr. Wilhelm Schmidt resulted in Robert Garbe carrying out practical trials on the Prussian State Railways in 1897, and in or about 1902, Schmidt introduced his "V" bolt-header design which was the first superheater with elements arranged in a number of separate flue tubes in a locomotive boiler.

The discussion after the paper brought out many interesting points, and among them were those made by the author in replying to one of the speakers who took part in the discussion. Most locomotive engineers, he said, would agree with the contention that superheating so far has not been carried to the limit which would justify the statement that it has been exploited to its full measure within the bounds of practical engineering. On the other hand, there are still some engineers who consider 600° F. to 650° F. to be the limit to which locomotive superheating should be raised. If, however, the matter is looked into carefully, it will usually be found that those who make this contention have not availed themselves fully of the knowledge and experience gained on the more progressive railways. Some engineers also consider it a waste to send superheat up the chimney, whereas it has been conclusively proved that the more heat sent up the chimney the greater is the economy in fuel, because the ruling factor is b.t.u.s and not heat up the chimney. It is refreshing to find an engineer who is willing to take all the superheating that can be given to him, and this could be done, said the author, by designing the superheater first and building the engine round it; but as the position is generally the other way round, the superheater designer is hemmed in in all directions, more particularly at the front end. The suggestion was therefore that when a new design of locomotive was required, the chief mechanical engineer should get out his boiler and firebox design together with drawings of the tube plate but without showing any tubes, say what superheat is required, give the boiler pressure, and particulars of the wheel arrangement, size and number of cylinders, tractive effort and particulars relating to the line to be worked over, and leave it to the superheater designer to produce superheating apparatus to suit.

A Ministry of Transport for South Africa?

THE visit to this country of the Hon. F. C. Sturrock, Minister of Railways & Harbours in the Union of South Africa, and his recent broadcast in which he dealt with the part that the South African transport system is playing in the war effort, has directed attention once more to a question which has long occupied the attention of the Union. This is the desirability of establishing a Ministry of Transport in South Africa, a step which it is believed cannot long be delayed after the end of the war. There is in fact considerable support for the view that an organisation of this kind would be of greater value in periods of national crisis than during normal times, but although it was during such days of stress that transport ministries were first formed in Great Britain and elsewhere, it is realised that the inauguration of a scheme of this kind in the Union might be difficult to bring about in the midst of a war. The South African Railways & Harbours administration has frequently dealt with this matter in the annual report which the General Manager submits to the Minister of Railways & Harbours, and in the document covering the period to March 31, 1941, it is suggested that a Minister of Transport should control the South African railways and harbours, and in addition should be responsible for the regulation of all road and air services in the Union, as well as sea transport serving South African ports. It is not suggested that anything in the nature of a monopoly of one form of transport should be created or that the railways should be permitted to seize the bulk of the traffic offering. The railways, as the largest existing transport undertaking in the country, would naturally convey a greater value of traffic than other common carriers, but the aim would be to organise and co-ordinate all forms of transport in such a way that each would carry the traffic for which it is best adapted, and which it could handle most economically. The primary objective would be the development of an efficient, economical, and rapid transport system for all types of goods, livestock, and passengers.

To ensure the achievement of this end it would be necessary to establish a body fully representative of every interest concerned—transport, commerce, agriculture, industry, and mining—as well as of existing controlling authorities such as the Railway Administration, Provincial Councils, the National Road Board, the Central Road Transportation Board, the Shipping Board, and the Civil Air Board. This body could be designated the Transport Board and would advise the Minister of Transport on all matters appertaining to rail, road, air, and sea services, as well as road construction and maintenance, thus centralising under one head the function of several existing bodies and obviating the present overlapping and multiformity of policy in respect of matters affecting the transport industry generally. Under such an organisation, wasteful transport competition would be eliminated, public roads would be properly classified and standardised according to traffic requirements, and a carefully considered policy would be formulated for the construction and improvement of roads to open new areas and develop agricultural districts in co-operation with the various transport interests and with due consideration to the interests of the country in general. Uniformity of method and incidence of road and road vehicle taxation could also be achieved, as well as uniformity in the issue of certificates and licences for vehicles and drivers, and uniform traffic laws. Consideration would be given to the development of air traffic and also steamer services around the South African coast, and although each form of transport would naturally continue to operate independently, it would be possible under a Ministry of Transport to knit the entire facilities of the industry into one closely co-ordinated whole, without domination of one interest over another.

A further advantage to be derived from the creation of such a ministry would undoubtedly be the opportunity afforded of instituting effective systems of traffic control and accident prevention throughout the Union, and it is obvious that the sensible co-ordination of all forms of transport would stimulate industrial development and bring about a considerable influx of capital. It is felt that active steps towards the establishment of such a ministry should be taken at the earliest opportunity and that the ground should be thoroughly prepared for the introduction of a system of State control on a basis acceptable to all interests, ready to be put into operation when the war is over, to meet the increasing transport needs of the country and the industrial expansion confidently expected. For this purpose the immediate appointment of a commission representative of the various interests concerned is strongly recommended, this body to be empowered to take evidence and, after careful consideration of the matter in all its aspects, to submit a comprehensive report on the subject, with recommendations. So long as these matters could be put in hand without distracting energies from the union's war effort, there would appear to be a good case for an early study of transport as a whole in South Africa.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Locomotive Naming Ceremonies

21, Briarfield Road,
Tyseley, Birmingham,
September 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—I was extremely surprised to read Mr. R. Howard's letter in THE RAILWAY GAZETTE of September 4 regarding the naming ceremonies of the "Merchant Navy" Class locomotives. Mr. Howard's letter seems utterly ridiculous. Surely he would not begrudge our gallant merchant seamen this magnificent and worthy compliment of having Great Britain's latest air-smoothed locomotives christened in honour of their cause, especially at a time like this when the Merchant Navy is giving its all for us, and keeping open our very lifelines of supply and existence.

Mr. Howard may be interested to learn that the introduction of the "Merchant Navy" locomotives has aroused widespread interest both in Canada and the United States, and the christening ceremonies have been greeted with profound and sincere enthusiasm by our friends over there. So great has been the interest taken in the naming ceremonies by our friends in the United States that I receive many letters asking for pictures, booklets, and other literature about the Southern Railway and the "Merchant Navy" Class Locomotives in particular many being from railroad men themselves.

These engines have aroused more interest than any other British locomotive has ever done—simply because they have been named in honour of the Merchant Navy, quite apart from their other excellent qualities. Many of our friends in the U.S.A. are eagerly looking forward to the next New York World's Fair (when this "bother" we're having with Hitler is finished) and to see an engine display there. Such an event would arouse the deepest interest, and enthusiasm, perhaps more so than the visit of the L.M.S.R. Coronation Scot in 1939. No finer or more worthy names than those of the Merchant Navy could be bestowed upon a locomotive, and certainly no finer locomotive could have the honour of bearing them than Mr. Bulleid's handsome Pacific engine. The Chief Mechanical Engineer and indeed everyone on the Southern who has taken part in the production of the "Merchant Navy" Class are worthy of the highest congratulations in their magnificent and noble enter-

prise, and surely this enterprise is worthy of a christening ceremony—many times over. Surely Mr. Howard will appreciate that it is heartening and gratifying to know that he, we, and the Southern Railway can at least take an interest in something other than war and bloodshed.

Referring to Mr. Howard's statement as to the nameplates which have been removed from other British locomotives, I am aware of only the three which have been taken off the Great Western Railway locomotives, "Japanese Monarch," "Italian Monarch," and "Roumanian Monarch." Perhaps Mr. Howard can supply details of the others—if there are any? The G.W.R. names were removed for obvious reasons, and not as a matter of wartime economy.

Yours faithfully,
A. RICHARDS

Locomotive Lineaments

Travellers' Club,
Pall Mall, S.W.1,
September 23

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR.—I was surprised to learn recently that the design of the Southern Railway "Q1" Class locomotive included a feature which would have achieved the seemingly impossible result of making them yet more unsightly than they are already. I realise that it is desirable to achieve the greatest measure of accessibility to many parts of the locomotive, and this was not the case in some of the more old-fashioned designs. Perhaps, however, THE RAILWAY GAZETTE at some time might include a general article on the value of the aesthetic in locomotive design, and thus encourage a more slightly era by pointing out the merits of symmetry and good-looks? There is something in the point. Flourishing civilisations are not ugly ones. The principles of Euclid were used by the Greeks to produce the greatest architecture and sculpture of the world. They have been used by the neo-Georgians to produce Cubism! Who runs may read! Incidentally, what are the ethics of one locomotive engineer completely altering and frequently defacing the superior works of his predecessor? When one recalls the wreckage which Uriel effected amidst Drummond's beautiful work one is tempted to charge him with malice as well as vandalism. Drummond never made an unsightly engine. Uriel never made a slightly one. To my mind, the cult of the hideous began on British railways with Uriel.

Yours faithfully,
HENRY MAXWELL

Publications Received

Fundamentals of Vibration Study. By R. G. Manley. London: Chapman & Hall Limited, 11, Henrietta Street, W.C.2. 8½ in. x 5½ in. 128 pp. Price 13s. 6d. net.—In the Foreword to this volume, applied vibration study is stated to be an important and even a major influence in many branches of modern engineering practice where fluctuating stresses, originated by periodically varying components of the motive forces, may seriously jeopardise structural stability. The author, in his Preface, remarks that the need for a really introductory book on vibration theory has been felt for some time, both by technical staffs engaged in vibration research and by others whose work brings them into contact with the problems of the subject. With this we agree for the reason that although some excellent text books are available in which it is covered, there has been for long a desire for a work devoted entirely and solely to vibration and its effects. In the railway field, as in others of an engineering nature, undesirable effects produced by vibration are considerable, and to quote a single instance associated with railways, reference may be made to the high-speed diesel trains introduced in Germany a few years back which as originally constructed suffered a good deal from vibration and were most uncomfortable to ride in. This difficulty was subsequently overcome and for the most part trains of this description not only in that country, but elsewhere, have left little or nothing

to be desired in this direction. The book is technical throughout; it is very thorough and must have involved a great deal of hard work and patience in its compilation. Attention has been confined by the author to the basic theory, a knowledge of which is essential to a thorough understanding of the physical phenomena. No previous knowledge of differential equations is assumed; this troublesome part of the theory is dealt with by the powerful and easy method of operators; indeed, the only mathematical equipment is that which should be at the command of anyone who has gone but a little way beyond the matriculation syllabus. A series of notes in the appendices serves as a bridge between the school work and those parts of analysis which are required by the text. A feature worth noting is the provision of a list of symbols that occur most frequently in the text; a good index and a table of contents further assist in the same direction.

Diesel Maintenance. By T. H. Parkinson. London: Iliffe & Sons Ltd., Dorset House, Stamford Street, London, S.E.1. 7½ in. x 5 in. 196 pp. Illustrated. Price 6s. net.—The author of this book is the Motor Vehicle Rolling Stock Engineer of Leeds City Transport and his experience of operating high-speed diesel engines of moderate outputs goes back to pioneer days some 12 years ago when he took part in the essential development work. As might be expected, the subject of maintenance receives practical and authoritative treatment. A short history of the modern

transport diesel is followed by sections on the overhaul, repair, and adjustment of the engine and its injection equipment. Further chapters deal with the adjustment of auxiliaries, with bench and road testing, and with spare parts. The book concludes with chapters on workshop layout and on miscellaneous matters. It is felt that whatever type of diesel may have to be serviced, the engineer in charge could scarcely fail to obtain useful data and guidance from this book.

Concrete Simply Explained. By Victor S. Wigmore, F.S.E. Reprinted from the transactions of the Society of Engineers (Incorporated). Weybridge, Surrey: 56, Church Street. 8½ in. x 5½ in. 48 pp. Price 1s. 6d. (By post 1s. 8d.)—We have received an advance copy of this paper which the society is publishing in book form. The book is intended for those who handle concrete, including the man at the mixer, as well as for students of structural and civil engineers. It is written in simple language so that it can easily be understood and no knowledge of the subject on the part of the reader has been assumed. The text is written in a personal and interesting fashion which should appeal to those to whom it is addressed. There is an index of over two pages and an introduction by M. T. J. Guerite who takes the opportunity of showing that the author, who is in charge of the cement and concrete Department of a world-renowned firm of testing engineers, possesses a knowledge of the subject which is almost unrivalled.

The Scrap Heap

On June 15 last, eleven members of the rank and file of the staff of the London Transport signal department volunteered to give some of their spare time to making delicate mechanism for aircraft. As more equipment became available the number of volunteers rose to 150. Every evening 40 of them worked a shift varying from three to five hours in duration. By the end of August they had given 3,500 hours of their spare time. Today there are 200 volunteers in the scheme, and more are coming forward every day. Male and female workers in all grades are represented.

* * *

No Briton, says the Minister of Pensions, feels he has had full justice until he goes before a committee. And no Civil Servant, of course, feels he has had full justice until he is sitting on the committee, or has at any rate invented a new one to sit on.—*From "The Evening News."*

* * *

It is reported from Turkey that, due to increased sabotage, trains between Milan and the Turco-Bulgarian frontier are being run only in the daytime.

Cried Goebbels: "How the Balkans glow With love for our Teutonic might! But careful is the word, and so The night-train will not run to-night. "They know our motives to be pure, Our actions ever kind and right. But, just to make assurance sure, The night-train will not run to-night. "De-rail a train? They'd rather die. They'd never bomb a station? Quite. But do not dare to ask me why The night-train will not run to-night."

—E.C.

A few weeks ago, traversing the level crossing at Liss, in Hants, for years in shocking repair, I omitted to slow down to a crawl and my head was brought into violent contact with the roof of my car. I wrote to the railway company, pointing out that it might well have been Winston Churchill's head instead of mine, and believe it or not, when I went over that crossing today there was newly laid tarmac as smooth as a billiard table.—*From "The Countryman."*

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L.M.S.R. ALLOTMENTS FOR THE PUBLIC
The L.M.S.R. is now prepared to let plots of land on its embankments to the public. L.M.S.R. allotments already under cultivation would, if placed end to end, equal a 30 ft. wide track from London to Dumfries, a distance of 332 miles. By offering plots to the public it is hoped the area under cultivation next year will greatly exceed this and it is the aim of the company to extend the distance from Euston to Thurso, 722 miles away, and the most northerly L.M.S.R. station.

* * *

Two stop signals on the same post, of a lowness reminiscent of old Brighton practice, are to be seen at Rickmansworth (Met. & G.C. Joint Committee). They form the down starter, and the upper arm is of sufficient height to be visible by drivers as they approach the sharp curve through the station, being well above the roofs of the buildings. When a train is standing in the station, however, the platform awning prevents the guard seeing the top arm, so the lower semaphore is provided for his convenience.

A correspondent writes criticising the number of times that tickets are checked on one of the four main-line railways and stating that on one occasion he had his ticket examined three times during the journey. He suggests that the manpower involved might be used to better advantage. The reason for the activity of the ticket examiners is, of course, to ensure that third class ticket holders do not travel in first class compartments. Possibly the irritation of those holding first class tickets might be allayed if the ticket examiners adopted the technique of London Transport's Billy Brown, and addressed those in first class compartments with:

"Pray, sir, pardon this inspection,
It is done for your protection,
Also partly for detection,
Leading to excess collection."

* * *

Extensive research has fairly well established that the first record of a dining car service in North America should be credited to the Great Western Railway of Canada (now part of the Canadian National System) which operated the first scheduled dining car service in 1867—75 years ago—according to an article by Mr. C. J. Hanratty in *The Canadian National Magazine*.

* * *

The removal of horses from the street cars and the propulsion of the latter by means of electricity already has been

accomplished in many of our towns and cities. The day seems to be near at hand when this marvelous agent will be still more extensively employed in connection with pleasure carriages and vehicles of all kinds. In fact, the electrical omnibus now exists in London.—*From the "Scientific American," August, 1892.*

* * *

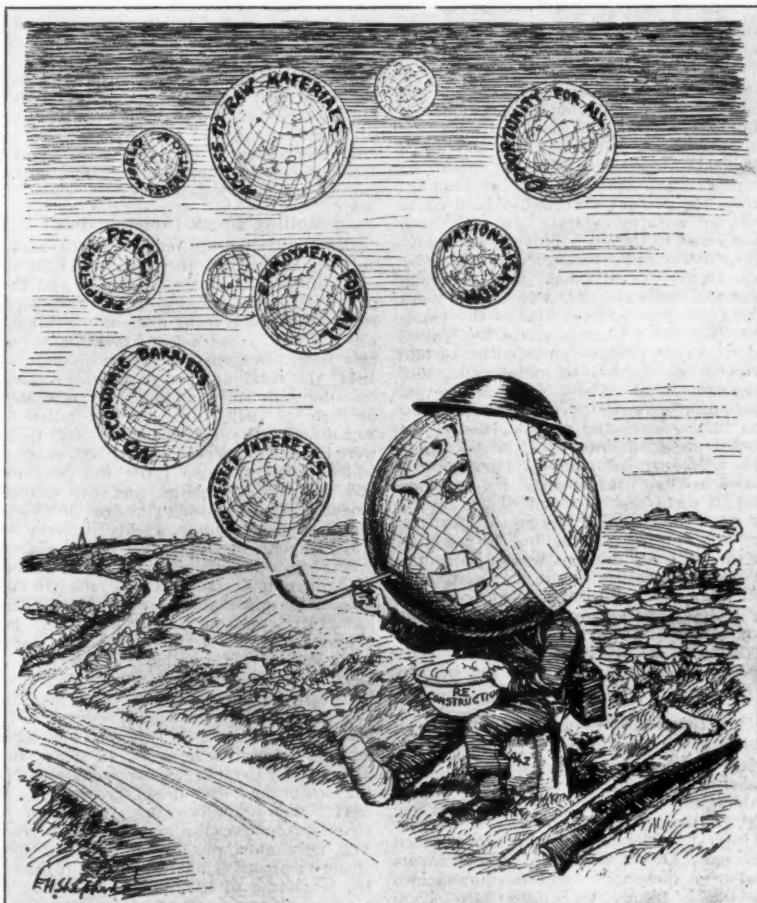
Three Danish industrial workers in Hamburg have been sentenced to death for "persistently stealing luggage" at Altona main railway station during the black-out, states the Danish *Nya Daglig Allehanda*.

* * *

On the London Transport farms at Bushey and Aldenham (104 acres), Northolt (8 acres), and Staines (16 acres), nearly 600 tons of potatoes will have been collected within the next few weeks, together with 300 tons of green vegetables, and 100 tons of root vegetables. Last year the board's farms supplied 22 per cent. of the vegetables used in the staff canteens; this year it is expected that the figure will be 80 per cent.

* * *

A member of our staff who recently returned from a period of Government service on one occasion had some letters returned to him for correction. In writing them he had used the word "agree"; they were returned so that he might alter it to "concur".



Great Expectations

[Reproduced by permission of the proprietors of "Punch"]

OVERSEAS RAILWAY AFFAIRS

(From our own correspondents)

CANADA

Combined C.P.R. and C.N.R. Traffics

Heavy wartime demands upon the services of the Canadian Pacific and Canadian National Railways resulted in a combined net profit in the first half of this year of \$59,966,954, a substantial increase on the previous record of \$52,027,905 for the first half of last year. The figure was about double that for the first half of 1940, more than twelve times that of the corresponding period of 1939, and contrasted with a deficit of \$2,998,955 in the first half of 1938. Judging by the gross figures for the first seven months of the year (given in our September 18 issue), the railways' business continued to expand during August. The combined net earnings of the two railways during the first six months of the year compare as follows :

1942...	...	...	859,966,954
1941...	...	...	\$52,027,905
1940...	...	...	\$28,836,088
1939...	...	...	\$4,845,927
1938...	...	...	-\$2,998,955
1937...	...	...	\$14,928,102
1936...	...	...	\$9,266,040
1935...	...	...	\$8,241,083
1934...	...	...	\$12,432,953
1933...	...	...	\$1,882,160
1932...	...	...	\$4,731,509
1931...	...	...	\$4,556,168
1930...	...	...	\$19,500,593
1929...	...	...	\$36,729,207
1928...	...	...	\$32,986,384

C.N.R. Financial Measures

The Hon. C. D. Howe, Minister of Munitions & Supply, speaking in the House of Commons recently on a bill to provide the Canadian National Railways with \$23,600,000 to assist in financing operations for 1942, said that any surplus earnings during the present year would be used to build up working capital. In reply to a question as to the advisability of paying for additions and improvements out of revenue, Mr. Howe stated that the Canadian National Railways followed to a great extent the standard practice of the Interstate Commerce Commission of the United States. That practice provided for certain items being charged to maintenance and others to capital. The C.N.R. was showing substantial earnings over all charges, that was to say, over the requirements of the funded debt, maintenance, depreciation, and retirement of equipment-trust certificates as they became due. He supposed that, if there was no standard accounting practice, those funds could be used for constructing new equipment, but 40 per cent. of the railways' income was paid to the Federal Government in taxes; and, anything over standard profits, which was not likely to be earned, would be paid to the Government in some form. The Minister added that a depreciation fund of over \$9,000,000 for equipment was set up last year.

Level-Crossing Accidents

There had been 380 level-crossing accidents during the course of last year, compared with 566 in 1917, said Colonel Cross; although in the latter year there were only 200,000 motor vehicles in Canada, whereas in 1941 1,500,000 motor vehicles had been licensed. Of the 1941 total, 134 accidents had been caused by vehicles running into the sides of trains. Since 1909, \$43,000,000 had been spent on safety improvements for level crossings, of which there were still 30,000 in Canada in spite of many having been eliminated. One of the recent

successful safety measures introduced was that which employed flashing lights. He thought that, considering the amount of traffic, 1942 would prove to have witnessed the lowest number of crossing accidents on record.

UNITED STATES

The Transport of Petroleum

One of the war problems which American railways have tackled with complete success, despite confident prophecies to the contrary, has been the handling of oil, previously taken to the sea from the producing centres in Louisiana, Mississippi, Texas, and Oklahoma, and brought round by tankers to the east coast ports. The tonnage of petroleum carried by the railways has multiplied 70 times since Pearl Harbour, and by mid-July had reached an equivalent of 788,500 barrels daily, or nearly the target of 800,000 barrels which the railways claimed as possible when the experts had declared them incapable of moving half that quantity. One measure that has been taken is to marshal the tank wagons into trains of 60 wagons, which are moved as one block from terminals nearest the producing areas to the most suitable centres in the east for distribution. This method ensures a rapid run for the oil trains, without any marshalling en route, and a quick turn round for the tank wagons, so that the equipment can be put to maximum use. Another heavy diversion from sea transport to rail has been coal from the coalfields of Virginia, Maryland, and parts of Pennsylvania to New England; in the first 28 weeks of 1942 the railways moved 3,200,000 more tons of coal into New England than in the corresponding period of 1941.

Rolling Stock Construction

Despite the exceptional demands made on builders, both by the size of the railway companies' orders for rolling stock and the rival claims of munitions manufacture, steady progress is being made in overtaking the railway construction programme of new freight wagons. Whereas on July 1, 1941, the total number of freight wagons on order with American builders was 92,566, by July 1, 1942, the total had fallen to 39,530. In the first half of 1942 there were installed in service 31,887 box wagons, 14,398 coal wagons, 1,370 flat wagons, 265 refrigerator wagons, and 849 miscellaneous wagons; this aggregate of 48,769 represents an average weekly delivery of 1,876 wagons, or 268 daily. Of the wagon orders still outstanding, the total of 18,388 for conveying coal exceeds the 16,023 wagons for miscellaneous merchandise. The locomotive position is not so good, for whereas on July 1, 1941, the new locomotives on order totalled 559, on July 1, 1942, the number had risen to 917, 350 to be steam locomotives, and the remaining 567 diesel, diesel-electric or electric. In the first six months of 1942, 365 new locomotives went into service (148 steam and 217 diesel or electric), as compared with 261 (62 steam and 199 diesel or electric) in 1941. The rapidly-rising proportion of steam locomotives is a matter for comment. The maximum possible number of new steam locomotives likely to be built during the remainder of 1942 is 265, according to a recent estimate.

Handling Peak Traffics

It is generally expected that the peak in American railway traffic will be reached in

1943. Steam locomotives out of service for overhaul or repair have now been brought down to the low figure of 7½ per cent., and a total of roughly 18,000 steam freight locomotives is at present available. That no motive-power shortage has developed up till now is due to the energetic methods that have been put into operation to meet the situation. By compulsory rationalisation of road and rail traffic, much short-haul rail freight has been diverted to the roads, and long-haul freight hitherto carried on the roads has come to the railways. This has reduced the number of local freight trains moving over branches and short distances on main lines, and has released locomotives and freight wagons for the longer runs. The orders of the Office of Defense Transportation as to minimum loads a wagon of less-than-wagonload miscellaneous freight are releasing many more wagons, to an estimated total which by July 18 already had reached 43 per cent. of the wagons so employed. By that date eleven large railways, including the Pennsylvania and the Erie, had already surpassed, on an average, the minimum target of 10 tons a wagon set for September 1, and the average loading on all the 121 Class I lines had reached 8.9 tons a wagon. Increased efficiency of locomotive servicing is such that steam locomotives now frequently run for 400 to 500 miles on freight trains without change, as compared with an average of 100 to 150 miles as recently as 1929. During the first four months of 1942 the Class I systems handled 188 billion revenue ton-miles of freight traffic; the previous peak was 141 billion in 1929. It is a measure of increased locomotive availability that the larger total was handled by 17,893 serviceable steam locomotives in 1942, whereas in 1929 as many as 24,616 were needed to take care of the smaller tonnage. In future, as an emergency measure, railways with locomotives that they can spare will lease them, when required, to other lines that are urgently in need of additional locomotive power.

ARGENTINA

Road Construction

Some interesting statistics relating to road construction in Argentina up to the end of 1941 are given in an article by the President of the National Roads Board, published in the May issue of *Política Económica*. According to this, the total amount spent on national highway construction since the creation of the National Roads Board in 1932 up to December 31 last was, approximately, 292,435,000 pesos. A further 123,545,185 pesos was disbursed for road construction under agreement with the provincial governments, and in addition 22,714,152 pesos was spent on roads providing access to railway stations. The sum already expended on national, as distinct from provincial, road construction represents the completed portion of the so-called "900-million pesos plan," due for completion in 1954. The figure mentioned, which is expected to be considerably exceeded, is the estimated minimum income for road-construction purposes up to the year in question. Over the same period expenditure under the *Coparticipación Federal* scheme, under an agreement with the provinces, is expected to absorb a further 600,000,000 pesos. The income for road construction is derived from the special tax on petrol, heavy oils, and lubricants, together with an annual grant by the Government out of national revenue.

Pan-American Highway Links

The national road system of Argentina, which is being linked up gradually with

that of the neighbouring Republics, forms an important feature of the Pan-American Highway system described in THE RAILWAY GAZETTE of May 15, 1942. Of the various sections at present under construction, the main road to Chile is paved as far as the city of Mendoza, 691 miles from Buenos Aires; the remaining 123 miles to the Chilean frontier are rip-rapped. The Argentina-Bolivia highway is completed over the greater part of the distance. The trunk road connecting Buenos Aires with the Paraguayan frontier is paved as far as San Justo, 62 miles north of the city of Santa Fé. A further section of the Pan-American route has been opened to vehicular traffic by the completion of the road bridge, constructed at a cost of 650,000 pesos, over the River Dulce at Rio Hondo in the province of Santiago del Estero, which was inaugurated officially on July 28 last. Preferential attention is being given to the highway intended to link Buenos Aires with Brazil *via* the international bridge over the River Uruguay between Paso de los Libres and Uruguayana, plans for which are being studied. (This scheme was referred to in our August 14 issue, page 151.) Priority is being given to this scheme as it is essential that the road approaches to the structure shall be finished not later than the bridge itself, which, according to the programme, should be completed in 2½ years.

Engineering Meetings

The opening meeting of the 1942 session of the Argentine Centre of the Institution of Electrical Engineers was held in Buenos Aires on June 19, when the inaugural address was delivered by the Chairman, Mr. R. G. Parrott, M.Sc. (Tech.), M.I.E.E., on "Science, Electrical Engineers, and the War." At the meeting of the centre held on July 24, a paper, illustrated by lantern slides, was read by Mr. H. E. Didier-Garnham, Assoc.I.E.E., on "The Conversion of the Buenos Aires Telephone Network to Automatic." Mr. R. G. Parrott presided. A meeting of the Buenos Aires Branch of the Institution of Mechanical Engineers was held on July 15, at which a paper on "Substitute Materials" was read by Mr. H. N. Bassett. The Chairman of the branch, Mr. O. Steven, M.C., presided, and the paper was followed by a discussion. At a meeting of the Buenos Aires Association of the Institution of Civil Engineers, held on July 16, a paper on the petroleum industry was read by Mr. D. G. Butlin, M.Inst.P., Chief Chemist, Shell-Mex (Argentina) Limited. The paper was followed by the exhibition of two talking films (in Spanish) entitled, respectively, "El Petrolero," describing the principal products obtained from crude petroleum and the methods used in drilling, and "Destilacion," which dealt with the general structure of the substance and the principles of distillation.

SPAIN

Valencia Underground Project

The Valencia Municipality has under consideration the scheme presented by the Compania de Tranvias y Ferrocarriles de Valencia for an underground railway, to cross the city from north to south. The proposed line would begin in tunnel at the company's station outside the city and beyond the River Turia to the north, and, passing under the river and below the main thoroughfares, would surface near the terminal station of the Villanueva de Castellon Company, with the lines of which it would connect. The length of the underground line would be 3.3 km. (2.1 miles) and the approximate cost would be

some 18 million pesetas. There would be four intermediate stations in the city, but the importance of the proposed line is really in its connection with the two existing railways, both on the same (metre) gauge. The Compania de Ferrocarriles y Tranvias operates 149 km. (93 miles) of line and carries over 12½ million passengers, and the Villanueva de Castellon owns 59 km. (37 miles) with 1,200,000 passengers.

Santander-Mediterranean Railway

Tenders have been invited by the Ministry of Public Works for the construction of the Boó-Sarón length of the seventh section of the Santander-Mediterranean Railway. This is the last section remaining of the railway, and its completion will provide a direct route between the Biscayan provinces and the Mediterranean at Valencia. As at present surveyed the line will connect at Boó with the existing main line from Venta de Baños. The section to be constructed is a difficult one, traversing wild and broken country, necessitating a number of tunnels and viaducts. Nevertheless, the whole line is designed to accommodate double track when required, although at present it is intended to lay single track only.

ITALY

Railway Construction

Information has been received that the following constructional operations are at present in progress:—

(1) A double-track standard-gauge line to avoid Alessandria (Piedmont), 24 km. (15 miles) long; expenditure on road reconstruction in connection with this line is expected to total 29,500,000 lire.

(2) In the Venice region three overbridges to replace existing level crossings are in course of construction; the total cost is estimated at 7,000,000 lire.

(3) On the Vittorio Veneto-Ponte nelle Alpi standard-gauge line (to the north of Venice), Vittorio Veneto Station is being enlarged at a cost of 2,500,000 lire.

(4) A further extension of the Portogruaro-Sassetto line (Veneto province) is in hand, costing 1,000,000 lire, and work on another section, about 5 km. (3 miles) long, and costing 3,600,000 lire, is to begin shortly. The whole line, including Frammaggiori Junction, will have a length of 98 km. (61 miles), of which 46 km. (28 miles) so far are completed.

(5) Work is progressing on the tunnel to connect Equi Terme with Piazza al Serchio. Equi Terme is the present terminus of the standard-gauge line branching off at Aulla (to the north of La Spezia) on the La Spezia-Parma line; Piazza al Serchio is the terminus of the 58-km. (36-mile) standard-gauge line leading in a northerly direction from Lucca. When the link is completed, an alternative communication between Toscana and North-Western Lombardy, avoiding the coast, will be provided. The section Equi Terme-Casola Minucciano is scheduled for completion shortly; expenditure on this section will amount to about 9,500,000 lire.

(6) The Posillipo tunnel at Naples, destroyed in an R.A.F. raid, is being reconstructed at a cost of 3,500,000 lire.

(7) On the Palermo standard-gauge avoiding line, work is in progress which is estimated at 11,600,000 lire; and work on a further section, involving the expenditure of an additional 12,000,000 lire, is to be commenced shortly.

With regard to the Sicilian aqueducts owned jointly by the Italian State Railways and certain municipalities, supplementary work is in progress on the Favara di Burgio

aqueduct as well as on the eastern branch of the Littorio aqueduct, although both are already in operation. The western branch of the Littorio aqueduct is being completed at a cost of 38,000,000 lire. These aqueducts feed stations on several lines and supply water to 34 places in Agrigento, Palermo, and Trapani Provinces, including the town of Trapani; the aggregate population affected amounts to 325,000 inhabitants. The Favara di Burgio aqueduct is 147 km. (91 miles) long; the Littorio eastern branch is 89 km. (54 miles); and the western branch 220 km. (136 miles). When completed, these three aqueducts will have cost 145,000,000 lire.

Other less-important works include a motor road in Naples Harbour at a cost of 10,000,000 lire and improvement to the Catania Harbour railway system and to the railway connection between Apuania Harbour and the industrial zone of the town.

Ventimiglia Station

A new station building, about 900 ft. long, was opened at Ventimiglia on August 17. Ventimiglia, which is in Italian territory, used to be the combined Italo-French frontier station on the Genoa—Marseilles line, and the old station building offered poor accommodation. Since the collapse of France, the frontier station on the demarcation line of the Italian zone of occupation in France is Menton, 7 miles to the west of Ventimiglia. Menton-Garavan Station, about 1 mile to the east of Menton proper, has been renamed Grimaldi by the Italians, and they have established a halt between Menton-Garavan (Grimaldi) and Ventimiglia, named Latte. The other two railway frontier stations between France and Italy, Breil (on the Nice—Turin line) and Modane (on the Lyons—Turin line) have not been altered.

SWEDEN

State Railways Results

Swedish State Railways results for the first six months of 1942 show that receipts reached a record height. Gross receipts totalled Kr. 235,000,000, compared with Kr. 198,000,000 for the corresponding period of 1941. Receipts from passenger traffic increased by Kr. 12,000,000 to Kr. 83,000,000; and goods receipts by Kr. 25,000,000 to Kr. 152,000,000. About one-sixth of the increase in receipts was due to the fact of certain privately-owned lines having been bought by the State Railways. Expenditure amounted to Kr. 171,000,000 (against Kr. 142,000,000 for the first half of last year) including Kr. 15,000,000 allocated to the renewal fund. As interest on borrowed capital is estimated at Kr. 19,000,000, the net surplus amounted to Kr. 45,000,000, compared with Kr. 37,000,000 for the corresponding period of last year. For the month of June, the surplus over expenditure was Kr. 13,100,000, against Kr. 9,100,000 for the same month of 1941.

Private Railways Results

For the private railway companies, results are available only for the months from January to May, 1942, inclusive. Receipts for this period totalled Kr. 59,940,000, compared with Kr. 53,110,000 for the corresponding months of 1941; expenditure amounted to Kr. 46,300,000 (Kr. 39,710,000); the gross profit was Kr. 13,640,000 (Kr. 13,400,000). After deduction of amounts written-off, interest, and other items, the net profit was Kr. 4,260,000, against Kr. 4,970,000 for the corresponding period last year.

An Alternative to Compounding—II

Conclusion of a general survey which includes proposals for redesigning the cylinders and valve gears of locomotives

By W. A. Tuplin, D.Sc.

WITHOUT departing from the orthodox piston valve having about 4 in. travel for 10 per cent. cut-off, the simplest way to improve admission-port conditions for short cut-off working would appear to be the introduction of mechanism which causes the motion of the valve to be considerably different from simple harmonic. Cams oscillated by Walschaerts valve gear will do this for poppet valves, for which a movement of less than 1 in. may be satisfactory, but the same type of mechanism is hardly practicable in connection with piston valves, because of the greater mass and friction involved, and the greater movement required on account of the "lap" necessary to minimise leakage when the valve is closed.

The desired effect can be obtained by arranging matters so that the valve, when near the mid-point of its travel, is moving more slowly than normally would be the case, but accelerates, instead of de-accelerating, as the admission point is approached; thus in that vicinity it is moving appreciably faster than if its motion were simple harmonic and later

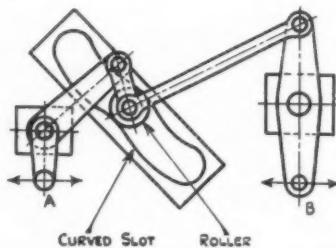


Fig. 4—Device for modifying motion produced by Walschaerts gear

de-accelerates more severely than usual, to the end of its stroke. This result is secured by taking the drive to the valve spindle through a roller, which oscillates in a cam-slot shaped for the purpose. In Fig. 4 the point A has the conventional motion

TABLE I

Cut-off	Proposed design			Piston area Port area		
	Expansion ratio	Valve travel in.	Port opening in.	Proposed design	L.M.S.R. Class 5*	P.O. 4-8-0†
Admission	Per cent.					
	10	5.5	3.8	0.50	19.8	39.0
	15	4.4	4.15	0.67	14.6	34.0
	20	3.66	4.49	0.85	11.7	30.6
Exhaust	Per cent.					
	10	5.5	4.5	2.25	4.4	6.05
	15	4.4	4.5	2.25	4.4	5.74
	20	3.66	4.5	2.25	4.4	5.43
	25	3.06	4.5	2.25	4.4	5.3
						5.46

* At corresponding cut-off

† Mean for h.p. and l.p. cylinders at corresponding expansion ratio

produced by Walschaerts valve gear, and B has the same motion modified in the way described. By arranging the linkage so that it contributes to the desired variation of movement the curvature of the slot may be comparatively slight, although the mechanism gives short cut-off port openings 50 per cent. greater than those given by the

Walschaerts gear alone. The figures in Table I indicate what large port openings are possible with this valve gear.

From Fig. 5, on the opposite page, it will be seen that the cylinder layout of the G.W.R. four-cylinder engines lends itself well to application of the proposed arrangement of valves and valve gear. Two sets of Walschaerts valve gear placed outside the frames operate the admission valves through two camboxes A and rocking levers B. The camboxes are so situated that there is ample space for large cam slots and rollers, giving the advantages of gentle cam profiles, low surface pressures and long life. An oil bath provides lubrication for the mechanism in each box. The connection between the mechanism and the valve spindle is by a relatively long link and so no extreme accuracy is required in the location of the cambox, relatively to the cylinder. The layout is such that a defective cambox can easily be replaced by a spare box. Furthermore, if the special mechanism proved to be unsatisfactory, it could be removed, and comparatively small modifications to the remaining parts would enable the valves to be worked by the Walschaerts gear in the normal manner.

The expansion link of each valve gear is mounted on a shaft extending just inside the frame-plate and connected by a tubular rod C to the reversing link D of one of the exhaust valve mechanisms. Each of these operates one inside cylinder exhaust valve directly, and the corresponding outside one by a rocking lever E.

As the radius-rod of the exhaust valve gear is always in its uppermost position when the engine is running forward, it is supported by a link which at the forward setting of the reversing gear, oscillates about an axis close to the axis of oscillation of the reversing link and there is thus little slip of the die-block. This arrangement requires no eccentrics, but as the return cranks and rods have to operate four exhaust valves, to the movements of which the crossheads contribute little, in addition to assisting in moving the admission valves, they have to be stronger than usual.

The driver's cab contains a single reversing wheel, controlling both sets of valve gear in a manner similar to that employed in the Webb four-cylinder compounds, as modified by Whale. When the engine is running, the exhaust valve mechanism is always either in full forward gear or full backward gear, and a simple interlock between reversing gear and regulator would prevent starting in any other condition. The operation of "notching-up" affects only the admission valve mechanism.

Inertia Loading on Valve Gear

At high speeds the greater part of the loading on conventional valve gear is due to inertia of the valves. For example, the maximum force to be exerted on a valve whose travel is 4 in. at a speed of 90 m.p.h. with 6 ft. 6 in. wheels is at least 8.5 times the weight of the valve and is proportional to the square of the speed. If the motion of the valve is other than simple harmonic, the maximum force may be greater than this.

The fact that the proposed valve arrangement does not require the end clearance spaces of the valve chests to be used for steam or exhaust makes possible a simple means of reducing the valve gear loading due to inertia. This is to use the air trapped in each end-space as a spring tending to return the valve to its mid-position.

In the case of the exhaust valves which have a fixed travel, it is necessary only to provide each clearance space with an anti-vacuum valve and with a relief valve set to blow off at a pre-determined pressure. These valves between them limit the maximum and minimum pressures and thus maintain the intended pressure range despite leakage of piston valve and stuffing-box. By this arrangement, inertia-loading can be nearly neutralised at any selected speed, and will be reduced to some extent at all speeds higher than 71 per cent. of that speed.

A simple means of providing some variation in cushioning effect according to speed is to provide each of the clearance spaces with a small orifice opening to atmosphere. At very low speeds this destroys the cushioning effect entirely (as is desirable) and at high speeds it has no appreciable effect on the pressure of the trapped air. By appropriate selection of clearance volume, relief valve setting, and size of discharge

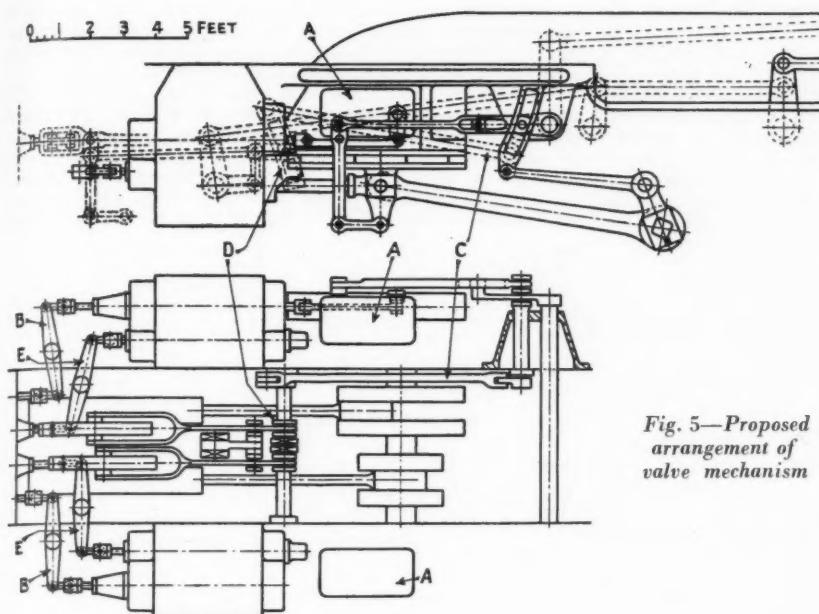


Fig. 5—Proposed arrangement of valve mechanism

orifice, the air-cushion can be made almost to neutralise inertia loading at say 75 m.p.h. and to exert an appreciable counterbalancing effect at all other speeds.

In the case of the inlet valves, the necessity to accommodate different valve-travels introduces less difficulty than might at first appear, because the longest travels apply only at low speeds and for short periods, and the relief valve and discharge orifice prevent the development of excessive pressures due to small clearance volume. Furthermore, at high speeds, where the balancing of inertia-loading is most important, the valve-travel is in practice restricted to a narrow range. Change in valve-travel is automatically accommodated by relief and anti-vacuum valves. To minimise entry of cold air to the cushioning spaces, the anti-vacuum valve may be arranged to draw from a vessel, open to the atmosphere, which receives the exhaust from the relief valve and discharge orifice. The non-harmonic motion of the admission valves makes it impossible to neutralise inertia loading exactly, but the maximum load at any selected speed may be reduced to a small fraction of its original value by the application of these air-springs.

The valve gear would be designed to take the inertia-loading at the highest speed, and grease-lubricated needle roller bearings are proposed for accuracy and simplicity of maintenance, and the load-reducing effect of the air springs would ensure long life.

Frame Arrangement at Front End

In many four-cylinder engines, the inside crossheads and glands are not easily accessible by reason of their position below the smokebox and between the outside cylinders. With inside and outside cylinders set longitudinally at the same spacing as the two driving axles, the inside crossheads, combination levers and glands can be made accessible by cutting away the frame-plates between the rear end of the inside cylinders and the front ends of the outside cylinders. This involves local reinforcement of the remaining parts of the frame, as for instance by welded-on bars, thus approximating to bar-frame construction. These bars are required mostly for the purpose of transmitting piston-load reaction between adjacent inside and outside cylinders. With external welded-on webs to take weight by compression from uncut parts of the frame to the outside bolsters and with the assistance of a reinforced smokebox floor to tie the smokebox saddles, an opening 30 in. by 20 in. may be made without unduly stressing any member. On each side of the engine there is a gap 30 in. long between the smokebox saddles and 9 in. wide between the smokebox and frame; this provides additional access and admission of light. With this arrangement, the inside running

gear is more favourably placed for examination and lubrication than in a normal inside-cylinder engine.

The Boiler and Firebox

The free steam-flow resulting from these valve, cylinder, and exhaust-arrangements makes it possible to utilise the maximum output of the boiler economically over a much wider range of speeds than usual. Consequently it is desirable to design the boiler for high evaporative power within the available limits of weight and size. The characteristics of the P.O. 4-8-0 boiler—short barrel and narrow firebox—and its efficiency of about 70 per cent, even at a combustion rate as high as 120 lb. per sq. ft. of grate an hour, suggests its application in this case. To achieve comparable results, it seems necessary to include a thermic siphon, and the widespread use of that device in America coupled with its more recent adoption in this country suggest that its application need occasion no serious difficulty.

The short tubes which are permissible without low boiler efficiency when the firebox heating surface is large, offer comparatively small resistance to the passage of the flue gases. The use of a large superheater, which means comparatively few small fire tubes, also tends in the same direction. It is probable that the use of enlarged superheaters on the L.M.S.R. has proved beneficial as much for this reason as for the raising of the steam temperature.

It remains for consideration whether Serve fire tubes are necessary to obtain maximum evaporative capacity from the space available in a short barrel. Their use in the French Nord Atlantics at the time when the G.W.R. experiments were proceeding and in the present-day Chapelon locomotives is surely suggestive. Nevertheless, the Serve tube has failed to find wide favour and in the present instance it is proposed to obtain the required ratio of tube heating surface to grate area by using a sufficiently large number of smooth tubes of normal diameter. With a grate area of 38 sq. ft. and a boiler barrel 14 ft. long, tapering from 6 ft. 6 in. to 5 ft. 9 in. dia., the ratios of heating and superheating surfaces to grate area may be made similar to those of the P.O. 4-8-0's.

To permit of low exhaust pressure in relation to the draught required for an adequate combustion rate, the Kyllchap design of blast type and petticoat types is proposed. It would seem desirable to adjust blast-pipe dimensions so that in normal operating conditions the boiler steams rather more freely than is absolutely necessary. The confidence of the enginemen in a locomotive that will steam reasonably well even with inferior coal is worth the small sacrifice in overall efficiency involved in slightly restricting the blast orifices.

An important question in connection with the use of a narrow firebox for grate areas larger than about 30 sq. ft. is concerned with the labour of firing. It is clear that, other things being equal, the longer the grate, the greater the physical effort required to fire it properly. On the other hand, it has been stated by the Nord company that the narrow grate, 37 sq. ft. in area, used in its Pacifics is easier to fire than would be a wide grate of the same area. This has been confirmed by at least one independent observer.* To make it true, however, it is necessary to provide the grate with an appreciable slope throughout its length, so that the fuel bed tends to work forward by vibration, to provide some means for rocking the grate in case this movement of the fuel bed should fail to take place as quickly as is desired, and to place the firedoor in a higher position than usual so that the upper surface of the fire can be made with a continuous slope steeper than that of the grate, when fuel thrown on to the back of the fire with moderate speed will tend to roll

* See *The Railway Magazine* of June, 1939, page 441

down to the front. There may, in fact, be a tendency for the self-feeding effect to occur too rapidly, and the deep fuel-bed at the back made possible by the use of a high firedoor is some safeguard against complete baring of the fire bars.

The firedoor would be power-operated under pedal control, and it is suggested that the Webb type of inward-swinging firedoor has an advantage in that, when closed, it offers no such resistance to the passage of gases through the firebox as is caused by the fixed deflector used with other types of firedoor. As a corollary to the use of the high firedoor, the coal space in the tender should be arranged so that all the

on a British express locomotive and the overload capacity of the proposed design would provide that most desirable operating feature, the ability to recover lost time by exceeding scheduled speeds uphill with loads heavier than normal.

The general appearance of a locomotive incorporating the features already mentioned is shown in Fig. 6. If, at first sight, the front end seems startling, it may be reflected that a similar reaction was probably produced by the initial appearances of the characteristic Churchward and Chapelon designs. In these proposals, except perhaps in valve-port areas, extremes have been avoided. Thus, the steam pressure

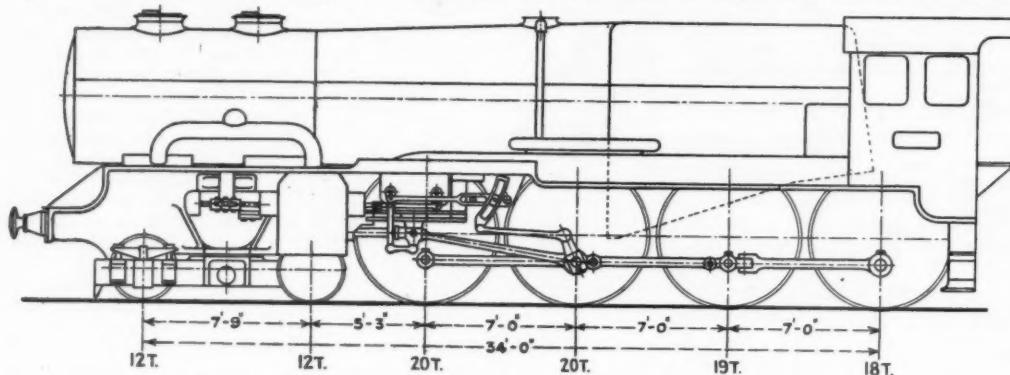


Fig. 6—Outline of locomotive embodying proposed details of design

fuel can be carried above the level of the firedoor and a power-operated coal pusher provided to bring fuel forward when required.

Wheel Arrangement

If these principles were applied to a development of the Great Western "King" there would be some increase in weight, and as the driving axles are already heavily loaded, the addition of a sixth axle is suggested. Whether this sixth axle should be a coupled axle or not is a matter for consideration, and it is interesting to recollect that the corresponding question, whether the wheel arrangement should be 4-4-2 or 4-6-0, arose whilst the French compounds were under test on the G.W.R. The present adhesion weight is rather low relatively to the tractive effort available from the cylinders, although the axle loads are the highest in reciprocating engines in this country and this suggests the coupling of the sixth axle as it could result in greater adhesion weight with lower individual axle loading. On the other hand, increase in the length of the rigid wheelbase is probably inadmissible, and the ideal would be the provision of a fourth coupled axle arranged with lateral play so as not to interfere appreciably with the negotiation of sharp curves and at the same time provided with spring side-control so as to restrain any tendency to "nosing" on the straight. It happens that the use of a sloping grate, even with ample ash-pan volume, leaves plenty of space round the fourth coupled axle for the accommodation of side control springs and also permits the frame to be narrowed behind the third pair of driving wheels, so as to accommodate lateral movement of the rear wheels.

The rear coupling rods would preferably be provided with vertical pin-joints at their forward ends and spherical-seated bushes at their rear ends, so as to permit of relative lateral movement between the third and fourth coupled axles.

Power Capacity

According to the remarkably accurate formula devised by A. N. L. MacLachlan,* the maximum sustained i.h.p. for this design should be about 3,300, as against 2,020 for the G.W.R. "King," 2,900 for the L.M.S.R. "Coronation" with double chimney, and 4,100 for the P.O. 4-8-0. When developing 3,300 i.h.p., the proposed locomotive's combustion rate for each unit area of grate would be much higher than normal British standards, although within the range over which the boiler of the P.O. 4-8-0 shows at least 65 per cent. efficiency. Upkeep costs would no doubt be high if such a power output were regularly sustained, but actually that would not be necessary. A drawbar h.p. of 2,000 covers nearly all peace time demands

and length of grate are each less than in the P.O. 4-8-0s, driving axle loadings are appreciably lower than the maxima already in extended use in this country, and the normal exhaust steam injector is proposed instead of the more complicated feed-water heater, which finds favour on the Continent.

TABLE II

Boiler dia. ...	...	...	...	...	...	...	...	6 ft. 6 in.
Length of tubes ...	...	...	...	...	...	...	...	5 ft. 9 in.
Heating surface—								14 ft.
Firebox (including syphon)	...	...	...	...	...	...	...	250 sq. ft.
Tubes ...	...	...	...	...	...	...	...	1,850 "
Superheater ...	...	...	...	...	...	...	...	680 "
							Total	2,780 "
Grate area ...	...	...	...	...	...	...	...	38 sq. ft.
Working pressure ...	...	...	...	...	...	...	...	250 lb. per sq. in.
Cylinder (4)—Dia. ...	...	...	...	...	...	...	...	16½ in.
Stroke ...	...	...	...	...	...	...	...	29 in.
Inlet valves—Dia. ...	...	...	...	...	...	...	...	8 in.
Max. travel ...	...	...	...	...	...	...	...	8 in.
Exhaust valves—Dia. ...	...	...	...	...	...	...	...	8 in.
Constant travel ...	...	...	...	...	...	...	...	4½ in.
Clearance vol./swept vol. ...	...	...	...	...	...	...	(Striking clearance in.)	0 in.
Driving wheel dia. ...	...	...	...	...	...	...	...	6 ft. 6 in.
Adhesion weight ...	...	...	...	...	...	...	...	77 tons
Total weight ...	...	...	...	...	...	...	...	111 tons
Tractive effort (85 per cent. b.p.) ...	...	...	...	...	...	...	...	40,300 lb.
Estimated i.h.p. ...	...	...	...	...	...	...	...	3,300

The rigid wheelbase and total wheelbase are each less than those of British Pacifics.

As compared with a compound the simple engine has the advantage of smaller steam-friction losses in steam-pipes and ports because each element of steam passes into one cylinder only instead of into two in succession. The valve arrangement permits of an expansion ratio as high as the overall ratio normally used in compound locomotives with exhaust at least equally free and favourably timed. The simple engine's disadvantage in difference of steam temperature between admission and exhaust is diminished by the use of separate valves. It is in the ports that the steam comes into most intimate contact with metal, and so with the admission ports maintained at the temperature of the steam coming from the superheater, and the exhaust ports maintained at the exhaust temperature, wasteful heat interchanges between steam and metal are considerably less than in a conventional simple engine.

On the whole, it seems reasonable to expect this simple engine to be but little behind the compound in overall efficiency. It would cost more in building and maintenance than the conventional four-cylinder simple and this would have to be set against its high overload capacity and probable fuel economy at high speeds.

* See *The Railway Magazine* of July, 1937, page 10

Eliminating Batteries from Signalling Circuits

The South Indian Railway has made appreciable savings in maintenance costs by the adoption of battery eliminators for certain types of circuit

IN India, as in Great Britain, large numbers of primary cells are in use on low-voltage signalling circuits and the cost of maintenance and renewals amounts to a considerable sum every year. On the South Indian Railway, for example, the following figures used to apply :

Type of circuit	Cells in use	Yearly renewals	Yearly renewal cost
Control ringing circuits	1,500	2,200	(rupees) 4,400
Through wire closed telegraph circuits	1,600	5,000	10,000
Superimposed telegraph open circuits	750	600	1,200
Block circuits	18,000	7,200	14,400
Repeater, indicator, reverser, etc., circuits	5,000	800	1,600
Total	26,850	15,800	31,600

As power is available in the control offices the company considered the advisability of abolishing primary cells, with a view to economy, but the high cost of the necessary equipment at first prevented this being done. The traffic control circuits in service are as follow :—

Name of control	Circuit	Length (Miles)
Madras Suburban	Madras Beach Tambaram	18
	Villupuram-Madras	102
	Villupuram-Trichinopoly (Main)	150
	Villupuram-Trichinopoly (Chord)	110
Central Control	Madras-Trichinopoly	249
	Madras-Erode	184
Madura	Madura-Trichinopoly-Podanur	196
	Madura-Dhanushkody-Trichinopoly	180
	Madura-Tuticorin	117
Erode	Erode-Ootacamund	112
	Erode-Trichinopoly-Jalapet	200
	Erode-Cochin Harbour-Calicut	242

Some of these require a voltage of 300 and the lowest voltage used is 190, on the Madras suburban circuit. There are 15 telegraph circuits superimposed on the control circuits and the highest voltage required is 140. The through-wire closed-circuits used for telegraphs total 17, and the maximum current is 19 m.a.; 11 of the circuits are about 100 miles long.

With the outbreak of war the difficulty in procuring battery elements caused the South Indian Railway to adopt eliminating equipment on certain circuits and an account of what has been done is given by Mr. M. S. Visvanathan, the Assistant Signal & Telegraph Engineer, in the *Quarterly Technical Bulletin* for July, 1942. It was decided to leave block and ordinary signal circuits on primary battery working, as any interruption in current supply would have serious results on train running, and, if outside power supplies were resorted to, elaborate standby equipment would be essential. In the case of the other circuits, however, such failures would not have the same effects and short power breakdowns could be covered by a simple form of standby. It was decided to retain the existing primary battery for the purpose, with hand-switch changeover, as the simplest, cheapest, and most convenient course under war conditions.

Power available at S.I.R. stations is A.C. 230 volts, 50 cycles, single phase. Rectifiers were thus required, and considerations of availability and cost resulted in the valve type being selected. In consequence of the encouragement given by the authorities to broadcasting in recent years appreciable stocks of valves were available at low prices. A series of experiments led to the American-type 83 valve

being adopted for the control, and the type 80 for the telegraph circuits. The former is a mercury-vapour hot-cathode valve and especially suitable for supplying d.c. of uniform voltage to circuits with widely varying requirements. The type 80 is a high-vacuum valve and more economical to use on through-wire circuits.

Consideration of the windings required on the transformers showed that the apparatus would not be readily obtainable in the open wireless market and it was decided to manufacture them locally in the railway shops. Restrictions on the importation of stallyo stampings made it necessary to use ordinary sheet steel plate and increase the core area some 50 per cent. at least to avoid overheating. This proved satisfactory. A complete eliminator consists of the transformer and valve, mounted on an iron frame, with the necessary fuses and switches. The valves for the control-ringing circuits have been connected with filaments in series and plates in parallel, enabling more than one control circuit to be worked off the same eliminator.

The economies realised have been appreciable; 1,500 Leclanché cells were in use in the 5 control offices as ringing batteries; the yearly consumption of elements and rods, which, of course, varied with the load and frequency of ringing, worked out at 35 per cent. a quarter for the whole railway, giving a yearly consumption of 2,200 sets of elements and rods. On all closed circuits the consumption has been about 80 per cent. a quarter; there are 1,600 cells, with 5,000 yearly renewals. In open-circuit working the consumption has worked out at 20 to 25 per cent. a quarter, or 600 for 750 cells a year. The total consumption for circuits which can be worked off mains was therefore 7,800; the annual cost was 15,600 rupees. The cost of installing 32 eliminators was Rs. 3,600, and yearly maintenance, etc.; charges come to Rs. 1,100, giving a net yearly saving, after allowing Rs. 500 for any additional charges associated with battery working, of Rs. 15,000.

Masking Colour-Light Signals in U.S.A.

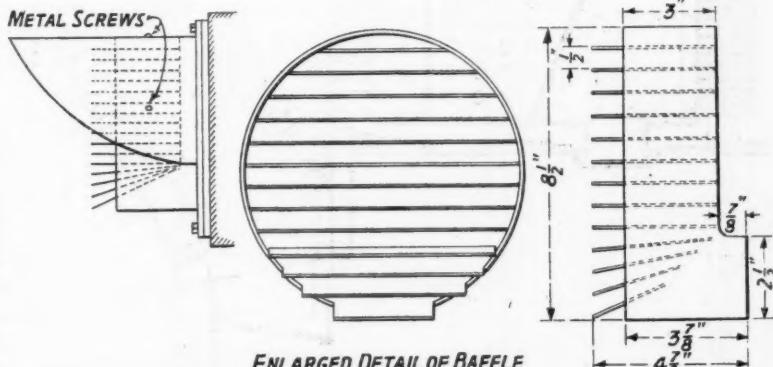
Details of a recently-designed baffle-plate hood

AN editorial note in our March 27 & April 3 issue referred to certain proposals that have been made in America with a view to rendering colour-light signals invisible to raiding aircraft. For some reason the deep hood, combined with dimming, which seems to satisfy the authorities in this country, does not commend itself in the U.S.A.—or at least not in some districts—and experiments are being made with other arrangements.

In a recent issue of our American contemporary, *Railway Signaling*, Mr. E. P. Weatherby, Signal Engineer of the Texas & Pacific Railroad, gives some particulars of a baffle-plate hood, designed by his staff at the request of the military authorities, and a drawing of which is reproduced. As will be seen, this is only 4*1*/*2* in. deep overall and is designed to prevent light passing upwards. There are 16 baffle plates, of which the four lowest are inclined so as to allow of a close up view of the signal aspect; the whole fixture is painted a flat black. The constructional details will be apparent from the drawing. Tests were made with an

ordinary colour light signal and one equipped with this hood, situated side by side on a signal bridge, and flights were

made at night at varying heights. Up to an elevation of 5,000 ft. and a distance of 6,000 ft. the unfitted signal could be seen, but at the same distance the hooded unit was invisible although the aeroplane descended to 500 ft. The hood is considered to make no noticeable difference to ordinary observation of the signal from the footplate.



American baffle-plate hood for colour-light signals

Old Railway Inventions Revived—I

Steam distribution valves and combustion chambers

By W. M. Walton

THE well-known saying that there is "nothing new under the sun" applies equally well to locomotive engineering as to anything else. In many cases modern improvements do not so much consist of entirely new ideas as of the development and perfection of old ones, often previously discarded as useless.

Long-travel valves, for instance, are often considered to be a modern development; yet valves with a lap of as much as 1½ in. were employed by Sinclair and Connor in the middle of the last century, and an example of a locomotive of the eighties

fitted with similar valves still survives in the celebrated 4-4-0s designed by J. Stirling for the former S.E.R. J. Beattie also used slide valves with long laps. The introduction of long laps thus cannot be claimed for the Great Western: what Churchward did was to perfect the principle by applying it to piston valves with large ports and using it in conjunction with high pressure steam, without which many of its advantages are lost.

Piston Valves

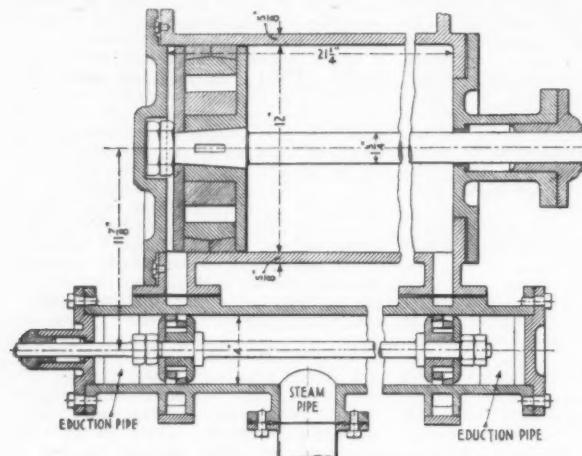
The familiar piston valve is itself an excellent illustration of an invention which has lain dormant for many years before, as it were, being accorded a place of honour among locomotive mechanisms. The first piston valve is shown in a drawing emanating from the works of Robert Stephenson & Co. about 1832 and reproduced as Fig. 1. The valve approximated to the modern type in many respects, having direct ports, inside admission, and split rings. In these respects it was definitely superior to the Bouch piston valves of 1872, and W. G. Beattie's 1876 design which

relied solely on their accuracy of fitting for steam-tightness, instead of on split rings, and consequently—especially in the case of Bouch's valves, which were of brass—it was no uncommon thing for the valves to seize fast in the steamchest. Moreover, no relief valves were provided at this period to allow trapped water to escape.

Some conflict of opinion exists as to whether or not Stephenson's piston valve ever got beyond the drawing board: nevertheless, its conception at such a period was a very remarkable feat. There is no reason why it should not have worked: in fact, in the shortness of the ports and the application of inside admission it was superior to the Smith valve of 1887, which was the first successful modern piston valve, and was apparently first supplied to N.E.R. 4-4-0s of that date. It had outside admission and split rings. The escape of trapped water from the cylinders was allowed by the use of a series of "collapsible segments" around the circumference of the valve, which, though normally held outwards by the steamchest pressure, fell away from the face if the pressure in the cylinder exceeded that in the steamchest. A similar principle is also applied in the Hughes & Robinson valves, the former of which substitutes ball-valves and the latter a flat annular valve for the collapsible segments of the Smith valve.

The first application of inside admission to the modern piston valve is rather a mystery: the earliest examples the author has been able to trace were those fitted by H. A. Ivatt in 1909 to G.N.R. No. 988 (small 4-4-2) and No. 417 (0-8-0) during superheated trials. Subsequently the same engineer equipped the last series of his large Atlantics, Nos. 1452-61 of 1910 with inside admission valves. The author would appreciate further information on this subject.

The subsequent development of the long-lap valve with narrow rings and relief valves is too familiar to need discussion; the great similarity, with the exception of the provision of long-laps, of the modern type to Stephenson's original 1832 arrangement, after almost a century of locomotive



Reproduced by courtesy of Robert Stephenson & Hawthornes Limited

Fig. 1—Details of Stephenson's piston valve of 1832

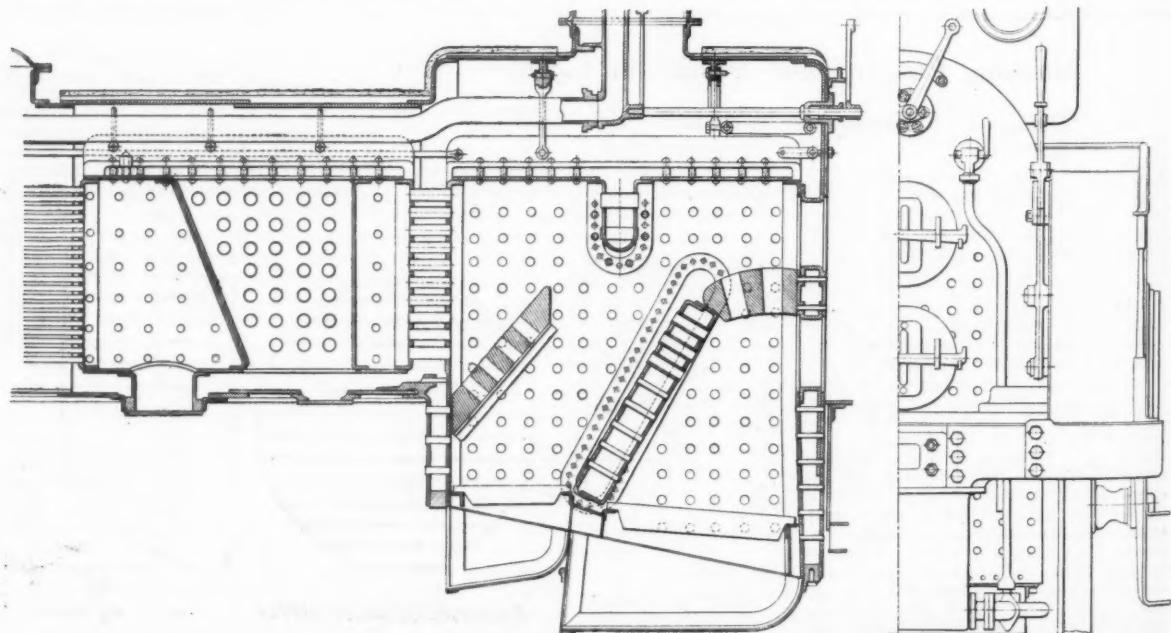
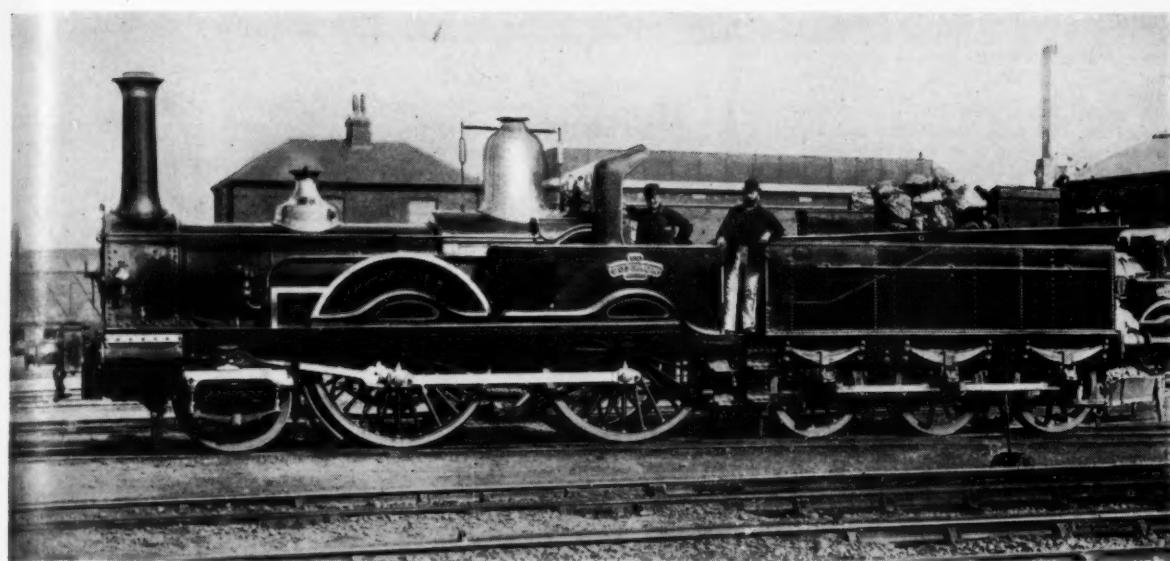


Fig. 2 (left)—Longitudinal section through firebox and combustion chamber with thermic siphon as used by Beattie in the 1860's and, Fig. 3 (right)—Half-end view showing duplicated fire doors,



"Cossack," one of Beattie's 2-4-0 express locomotives of 1870 for the London & South Western Railway, fitted with combustion-chamber firebox

development, is, however, one of the most remarkable features in locomotive history.

Combustion Chambers

Another characteristic of modern locomotives with a somewhat curious history is the provision of combustion chambers inside the boiler barrel. In present-day designs, the object of the combustion chamber, largely developed by the late Sir Nigel Gresley, is twofold: to increase the firebox volume, and to decrease the length of the tubes, which tend in modern locomotives to be on the long side; an incidental advantage is that the tubes need cleaning less frequently. The original object of combustion chambers was, however, to enable coal to be burned instead of coke, which fuel had the double disadvantage of higher price and a pronounced abrasive action on the firebox plates and tubes. This latter fault was such that the

life of coke-burning fireboxes was about only half that of similar boxes burning coal. The early boilers, however, had such small grates and fireboxes that the use of coal caused an excessive amount of smoke; the gases were too quickly brought into contact with the cold tubes and the flames thereby extinguished. This fault led to the introduction of many curious types of firebox, some, such as those of Joseph Beattie, being of an amazing complexity, with divers compartments interconnected by tubes, passages, and channels of all sorts, sizes, and shapes. In fact, it was probably due only to Beattie's hot water feed that such an aggregation of passages was ever capable of remaining steam-tight for any length of time continuously.

One of these fireboxes is shown in section by Fig. 2. It is, as seen, fitted with a combustion chamber connected at the rear by a series of short tubes to the firebox. It incor-

porates what appears to be a form of thermic siphon with cross heating tubes, and a transverse water leg is provided in the firebox, so positioned as to make necessary an additional fire-hole as seen in Fig. 3; otherwise it would have been impossible to use the space in front of the water leg as part of the fire bed. This in turn necessitated a divided ashpan, thus bearing out what has just been stated about the complicated nature of the Beattie design of firebox.

The germ of the modern combustion chamber is to be found in J. E. McConnell's boilers of 1852-3. Except for the provision of a longitudinal midfeather instead of a brick arch, necessitating, as in Beattie's design, two fireholes, the design was very similar to that of the modern boiler. The failure of McConnell's firebox is a good example of a sound idea spoiled by faulty proportions; he made his combustion

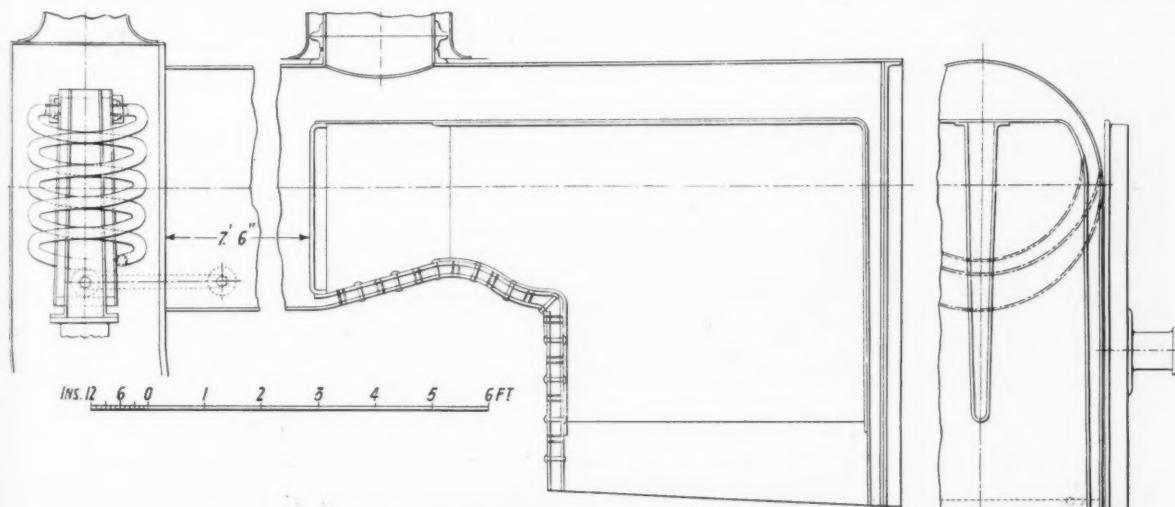


Fig. 4—Sectional elevation and cross section through firebox with combustion chamber; also showing feed-water heater in smokebox of McConnell locomotive. Note midfeather in cross-sectional view

chamber of too great a length, thus excessively cutting down that of the tubes; smokebox temperatures became abnormally high, and fuel was consequently wasted. Another fault was that of cramming far too many tubes into the barrel, thus restricting the water circulation and also considerably weakening the tube-plates. In a later design, that of 1861, these defects were remedied in some degree, but in common with that of Beattie, McConnells arrangement was speedily abandoned when the brick arch and firehole deflector were introduced on the Midland Railway. The growing length of locomotive boilers, and the need for further increase in firebox volume, were the factors which led to the revival of the idea in modern times. Fig. 4 is a drawing of McConnell's arrangement of combustion chamber and also shows his smokebox pattern feedwater heater. These are in accordance with one particular patent of his, *i.e.*, No. 13,729 of 1851.

The combustion chamber employed by F. W. Webb is worthy of mention. It was fitted to the compounds of the 2-2-2-2 "Greater Britain" class of 1891 and as shown in Fig. 5 has a length of 2 ft. 10 in., dividing the tubes into two portions about one-third of the way along the boiler barrel. As seen, a tapered ash discharge hopper was provided, this having at its lower end a balanced valve operated from the footplate. What today is termed a soot blower was used for assisting to keep the tubes clean; steam was admitted through a series of small nozzle openings at the top extremity of a vertical pipe and escaped through similar openings in each of the horizontal fore and aft branch nozzles in line with the tube openings near the centre of the combustion chamber. A circulating pipe allowed the water in the

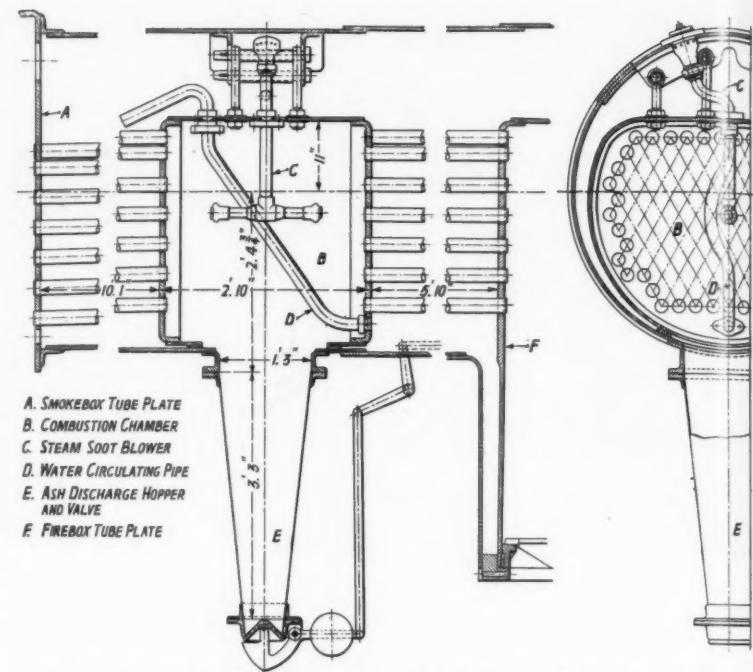
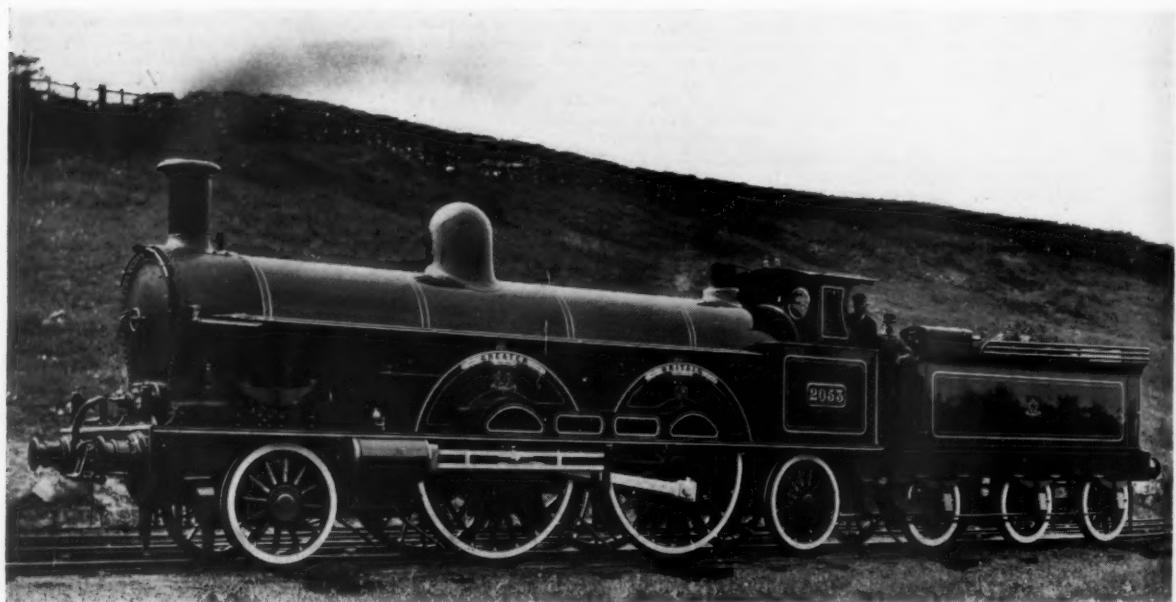


Fig. 5—Details of Webb's combustion chamber with ash-discharge hopper and tube soot blower

lower portion of the boiler on the firebox side to pass through to the top of the combustion chamber on the opposite side where it was discharged through a bent con-

nection at a point near the front of the combustion chamber. The original of Fig. 5 was kindly provided by Mr. W. A. Stanier, Chief Mechanical Engineer L.M.S.R.



F. W. Webb's 3-cylinder compound "Greater Britain," of 1891, fitted with combustion chamber as shown in Fig. 5

Two h.p. cylinders 15 in. by 24 in.; one h.p. cylinder 30 in. by 24 in.; driving wheels 7 ft. 1 in. dia.; leading and trailing wheels 4 ft. 1 1/2 in.; boiler barrel, length 18 ft. 6 in., dia. 4 ft. 3 in.; heating surface tubes 1,346 sq. ft.; combustion chamber 39.1 sq. ft.; firebox 120.6 sq. ft.; total heating surface 1,505.7 sq. ft.; grate area 20.5 sq. ft.; steam pressure 175 lb. per sq. in.; weight of engine in working order 52 tons 2 cwt.; adhesion weight 31 tons; tender, tank capacity 1,870 gal., fuel capacity 4 tons; weight in working order 25 tons; total weight of engine and tender in working order 77 tons 2 cwt.

RAILWAY NEWS SECTION

PERSONAL

The King has appointed Sir David Victor Kelly, K.C.M.G., M.C., to be His Majesty's Ambassador Extraordinary and Plenipotentiary at Buenos Aires.

The King has authorised Mr. Arthur Anderson to wear the insignia of the Fifth Class (Civil Division) of the Order of Al-Rafidain conferred upon Mr. Anderson by the King of Iraq in recognition of valuable services rendered as Supervisor in the Shalchiyah workshops of the Iraqi State Railways.

The Lord President of the Council has appointed Sir Lawrence Bragg, F.R.S., Professor J. E. Lennard-Jones, F.R.S., Mr. A. McCance, and Sir Raymond Street to be members of the Advisory Council to the Committee of the Privy Council for Scientific & Industrial Research as from October 1. Dr. G. M. B. Dobson and Mr. S. K. Thornley retired from the council on completion of their terms of office on September 30.

The Ministry of Supply announces the appointment of Sir John Duncanson as Iron & Steel Controller. He is succeeded as Deputy-Controller of Iron & Steel Supplies by Mr. George Briggs.

The Minister of Supply has appointed Mr. D. M. Moffat, of Tube Investments Limited, to be Deputy-Controller of Inspection Administration, Ministry of Supply.

Mr. H. J. Allcock has been appointed Director-General of Communications Equipment, Ministry of Aircraft Production. He is Production Officer, and was formerly Process Manager, of Callender's Cable & Construction Co. Ltd.

The Board of Trade announces the appointment of the Right Hon. Lord Forrester as Director of Office Machinery, in succession to the Hon. Geoffrey Cunliffe, who has joined the Ministry of Production, but who remains a member of the Industrial & Export Council.

We regret to record the death of Mr. Leon Rueff, a Director of the Forestal Land, Timber & Railways Co. Ltd.

Mr. E. Rawdon Smith, O.B.E., who has been acting as Director of Public Relations in the Dominions Office, has been appointed Director of the Empire Division of the Ministry of Information. Mr. Rawdon Smith was from 1935 to 1939 Public Relations Officer, London Passenger Transport Board. In March, 1939, he was appointed Public Relations Officer, Imperial Airways Limited, and since the outbreak of war he has combined this position with his work in the Dominions Office.



Mr. A. F. Kirby

Appointed General Manager, Palestine Railways

the next year. He returned to railway service in 1919, and four years later was selected for a course of training in all departments, on the completion of which he was attached to the General Manager's Office for special duties. In 1926 he qualified by examination for associate membership of the Institute of Transport, and was one of the first candidates to do so. He was appointed Assistant Secretary, Takoradi Harbour, Gold Coast Government Railway, in 1928; he acted on several occasions also as Assistant to the General Manager; and in 1936 he became Traffic Manager. He was Secretary to the Conference of General Managers of West African Railways in 1929, and to the Gold Coast Committee on Rail and Road Transport in 1930. Mr. Kirby went to Kenya as Assistant Superintendent of the Line, Kenya & Uganda Railways & Harbours, in 1938.

We regret to record the death of Mr. C. B. Foster, who, until his retirement in 1937,

had been for 15 years Passenger Traffic Manager, Canadian Pacific Railway. Mr. Foster had served for 46 years with the company.

L.N.E.R. APPOINTMENTS

Mr. L. C. Glenister, Assistant Accountant, to be Chief Accountant, in succession to the late Mr. George Sutherland.

Mr. J. R. Dallmeyer, Surveying & Parliamentary Assistant to the Engineer, Southern Area, to be District Engineer, Ipswich, in succession to Mr. C. H. B. Smith, who is retiring shortly.

INDIAN RAILWAY STAFF CHANGES

Mr. B. C. Drummond has been appointed to officiate as a Divisional Superintendent on the N.W.R. as from March 31.

Mr. C. E. Fischer has been appointed to officiate as Deputy Engineer-in-Chief, B.B. & C.I.R., as from April 13.

Mr. S. M. Jamil has been appointed to officiate as Deputy Chief Accounts Officer, E.I.R., as from March 23.

Mr. G. E. Berkley, Chief Traffic Manager, G.I.P.R., has been granted six months' leave as from April 22.

Mr. K. J. McNeill has been appointed to officiate as Chief Traffic Manager, G.I.P.R., as from April 22.

Mr. F. P. Vandertaelen has been appointed to officiate as Deputy Traffic Manager (Rates & Claims), G.I.P.R., as from April 22.

Mr. K. C. Bakhle has been appointed to officiate as Deputy Chief Engineer (Construction), G.I.P.R., as from May 1.

Mr. A. G. T. Glaisher has been appointed to officiate as Controller of Stores, G.I.P.R., as from April 30.

Mr. E. M. Hebbard has been appointed to officiate as Deputy Controller of Stores, G.I.P.R., as from April 30.

Mr. B. N. Chopra has been appointed to officiate as Deputy General Manager (Works & Secretary), B. & A.R., as from April 23, in place of Mr. R. B. Seth (on special duty).

Mr. V. L. Thompson has been appointed to officiate as Deputy Chief Transportation Manager, B. & A.R., as from March 27.

Mr. A. G. Hall has been appointed to officiate as Deputy Chief Engineer, N.W.R., as from June 10.

Mr. R. Proudflock has been appointed to officiate as Divisional Superintendent, N.W.R., as from May 1.

Mr. E. L. Manico, V.D., has been appointed to officiate as Chief Operating Superintendent, N.W.R., as from May 18.

Mr. A. H. M. Campion, on recall from leave preparatory to retirement, has been appointed to officiate as Deputy General Manager (Works & Stores), B.B. & C.I.R., as from May 20.

We regret to record the death on September 13, at the age of 62, of Mr. Albert King, who was for many years Commercial

October 2, 1942

Manager of the Darlington Railway Plant & Foundry Co. Ltd. Mr. King entered this firm in 1901, after receiving his early training with Thomas Summerson & Sons Ltd., and served with it for 41 years.

Presentation to Mr. G. S. Szlumper

A gathering of about 50 officers and chief officials of the Southern Railway assembled at Charing Cross Hotel on September 22, when a presentation was made from them to Mr. Gilbert Szlumper, who, as already recorded, resigned his appointment as General Manager of the Southern Railway as from April 1 last (when he was released also from Government service) on taking up special duties for the Railway Companies' Association.

Mr. E. J. Missenden, the present General Manager, who was in the chair, said the fact that so many were there to do honour to Mr. Szlumper showed the esteem and affection in which they held him and that he had proved worthy of their respect. He said that, although Gilbert was the second General Manager of the Southern Railway, he carried on his banner the same proud motto as that of the Scots Greys—"second to none." In making the presentation of a silver salver, on which were engraved the autographs of the colleagues and friends present, together with an album containing the autographs of well-wishers, and an onyx cigarette box for Mrs. Szlumper, Mr. Missenden paid his own personal tribute. He said that when he (Mr. Missenden) went to Southampton Docks in 1930, Mr. Szlumper had given him all the guidance he possibly could, helping him to steer clear of rocks, and for that he was extremely grateful. Later, during his period as Traffic Manager, he had found him always a very approachable General Manager, always susceptible to new ideas, and always with that human understanding which gave him the happy knack of getting the best out of his staff. He knew that Mr. Szlumper's cheerful influence would remain with them, and he made the presentation with their sincere good wishes to himself and Mrs. Szlumper and with the hope that he would be spared long to give many useful years of service to the state.

Mr. John Elliot, the Deputy General



Mr. E. J. Missenden making the presentation to Mr. G. S. Szlumper

Manager, also was warm in his tributes, and said that when Mr. Szlumper succeeded Sir Herbert Walker, in October, 1937, and he (Mr. Elliot) became his Assistant, there was much speculation as to how the new General Manager would fare in following so great a predecessor, but he soon gave evidence of his complete ability. Mr. Elliot related various instances of the masterly handling by Mr. Szlumper of some of the most intricate problems of that time, in connection with electrification and road transport. During all the time he had been with Mr. Szlumper, Mr. Elliot said he had never found him other than courteous, cheerful, and smiling, and that his character would be a lasting inspiration to them all. Of the other chief officers, the Traffic Manager (Mr. R. M. T. Richards), the Chief Accountant (Mr. R. G. Davidson), the Audit Accountant (Mr. A. E. Moore), the Chief Mechanical Engineer (Mr. O. V. Bulleid), the Surveyor & Estate Agent (Mr. A. Endicott), and the Solicitor (Mr. H. L. Smedley) all spoke of their happy relations with Mr. Szlumper and of the great help their departments had received from him as General Manager; especial tribute to his good work at Southampton, when he was the company's Docks & Marine Manager, was

voiced by his then Assistant, Mr. R. P. Biddle (Docks & Marine Manager, Southern Railway, now Deputy-Director of Ports under the Minister of War Transport).

Expressing his thanks for the many kind references and the gifts Mr. Szlumper said that his railway life had been a constant joy to him. He recalled how he had started as a pupil in the L.S.W.R. Engineering Department, under Jacomb Hood, an extremely capable man, and his good fortune in becoming Assistant to Sir Herbert Walker. One of the first jobs given him by Sir Herbert was, early in 1914, to help form the Railway Executive Committee. Of this he was the first Secretary; and, although not foreseen at the time by all who attended the meetings, it played a very important part throughout the whole of the war, which started soon afterwards. Later, Sir Herbert sent him to Southampton to succeed Mr. Williams, the L.S.W.R. Docks & Marine Manager. There had been a great deal of post-war resuscitation to be done, but he found plenty of scope for young ideas. Afterwards he came back to headquarters as Assistant to Sir Herbert, where again he was more than grateful for the chance to learn from one of such outstanding ability. On succeeding him as General Manager, he had found the job no sinecure. There were many responsibilities in peacetime, and he felt that they must be much greater in wartime. Now, in retiring, he was realising one of his ambitions of long ago—to retire early and enjoy his leisure—but, with Hitler "spoiling the party," it was possible that they might find him in some other field of activity. When this war came to an end there would be many problems of great magnitude to be faced, but from his 40 years' experience he knew that the railway service, with its high standard and proud traditions, and with the character of those working in it, would meet them all successfully. Mr. Szlumper concluded by expressing his sincere thanks for all the friendship and comradeship which had been shown him during his term of office, and he hoped that those he was leaving would, in time, enter on their retirement full of vigour and happiness, and would enjoy it as he hoped he was about to enjoy his.



Group of Southern Railway officers at the presentation to Mr. Szlumper at the Charing Cross Hotel on September 22

TRANSPORT SERVICES

AND THE WAR—159

Motorcoach Withdrawals

The Regional Transport Commissioners have acted with commendable promptitude in implementing the new travel restrictions which were announced by the Minister of War Transport on September 6 (see our September 11 issue, page 257), so far as concerns long-distance motorcoach services.

The Green Line coach services of the London Passenger Transport Board were withdrawn on Wednesday, September 30, and additional or augmented bus services were introduced to carry displaced essential traffic for which other provision did not exist.

Practically all the coach services terminating at the Victoria Coach Station have now ceased to operate, and it is understood that the coach station will be closed to public passenger traffic, although reports of the discontinuance of the business of its proprietor, London Coastal Coaches Limited, are unfounded. In fact, this company's organisation is rendering valuable bus services in a number of directions, in common with many other motorcoach organisations, and such work must necessarily be continued.

The following are among the principal services of railway-associated companies recently withdrawn, showing in parentheses the dates of their last journeys:—

Southdown Motor Services Limited

London—Uckfield—Eastbourne (September 29)
London—Crawley—Brighton (September 29)
London—Dorking—Horsham—Worthing (September 29)

London—Midhurst—Chichester—Littlehampton—Bognor (September 29)

Where necessary, the needs of intermediate passengers will be met by the provision of extra local buses connecting with London train services.

Thames Valley Traction Co. Ltd.

London—Ascot—Wokingham—Reading (September 30)
London—Slough—Maidenhead—Reading (September 30)

These are the only two "limited-stop" services which have continued to be operated by this company until now.

East Kent Road Car Co. Ltd.

London—Canterbury—Deal (September 29)
Canterbury—Margate—Broadstairs—Ramsgate shut down the connection (September 29)
London—Folkestone—Dover (September 29)

Maidstone & District Motor Services Limited

London—Chatham—Gillingham (September 29)
London—Maidstone (September 29)
London—Tenterden (September 29)
London—Sheerness (September 29)
London—Tonbridge—Hastings (September 29)
London—Tonbridge—Rye (September 29)

Royal Blue Services

London—Bournemouth, by all routes (September 30)
London—Southampton, by all routes (September 30)
For the moment, the London—Salisbury—Exeter, Bournemouth—Exeter, and Bournemouth—Taunton—Iffracombe routes are continuing to work, but their position is subject to substantial change in the immediate future.

The fate of the remaining services of Associated Motorways in the South-Western Region had not been decided when we closed for press.

Altered L.N.E.R. Train Services

Important alterations were made in the London suburban services on the Alexandra Palace branch from September 7. The trains, which run between Finsbury Park and Alexandra Palace only, on weekdays now leave Finsbury Park at 6.20 a.m., at 20 min. intervals from 7 to 10 a.m., and then cease until 4 p.m., when a similar 20 min. service runs until the last train at 7.20 p.m. In the reverse direction there are 20 min. departures from Alexandra Palace from 7.5 to 10.25 a.m., and from 4.25 to 7.5 p.m. On Saturdays, the departures from Finsbury Park are at 20 min. intervals from 7 a.m. until 3 p.m. (except 10.40 and 11 a.m.), and correspondingly in the reverse direction, but there are

no evening trains, and there is no Sunday service.

An innovation in the G.E. outer suburban area is a through service from Chelmsford to Southend-on-Sea, at 6.52 p.m. on weekdays and 5.15 p.m. on Sundays, reaching Southend at 7.55 and 6.27 p.m. respectively; these trains call at all intermediate stations, reversing at Shenfield. An additional train runs on Sundays at 11.50 a.m. from Liverpool Street to Colchester, calling at all principal stations, and taking up at Colchester the working of the 1.45 p.m. to Clacton. In the north the 2.30 p.m. semi-fast from Edinburgh to Newcastle is altered to leave at 1.40 p.m., and is slowed 40 min. in running, reaching Newcastle at 5.55 instead of 6.5 p.m.

Gorleston North Station Closing

As a wartime measure, the L.N.E.R. and L.M.S.R. have decided to close Gorleston North Station for both goods and passenger traffic as from Monday, October 5.

Taxis at Waterloo

Passengers wishing to obtain taxis at Waterloo are now required to queue for this purpose, and the Southern Railway has made special arrangements for porters accompanying them with luggage. The position of the queue is as shown in the accompanying diagram; a photograph of the scene was reproduced in our September 25 issue, page 311. The arrangements, which are under police supervision, have been in force since September 20, and have received much praise. The system has been responsible over a period of 12 hr. for catering for 3,500 passengers in 1,600 taxis, and 200 persons are now catered for in 7 min. The public is directed to the queue by posters.

Delivery Zones in Germany

From various statements which have appeared recently in the German press, it appears that the methods which are being adopted in Germany closely parallel those in force in Great Britain regarding the rationalisation of civilian goods transport, limiting the areas over which certain types of goods may be conveyed. It is noteworthy that some effort is being made to encourage individual initiative. In the recent rationalisation of the transport of beer, the necessary measures were worked out by the industry concerned, and it is suggested that a similar course should be

adopted with other commodities. Heretofore it has appeared that the many forms of control of German transport have been imposed by the Government, and that the co-operation of industry has been sought only in the execution of such Orders and not in their planning.

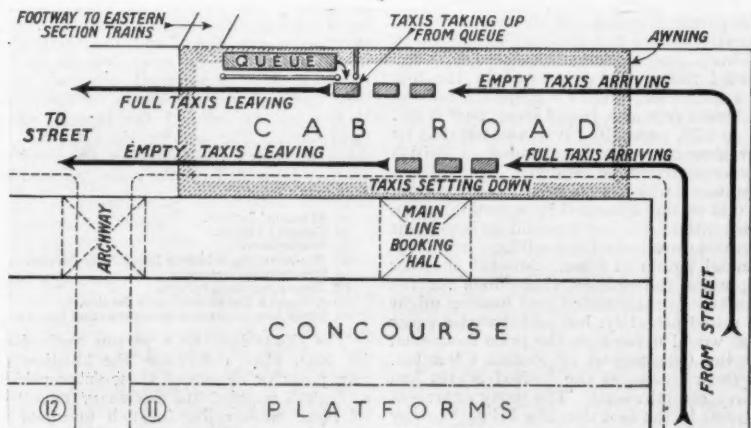
Gauge Conversion in Germany

The *Hamburger Fremdenblatt* on August 12 stated that the Council of Ministers for the Defence of the Reich has issued a Decree for the modernisation of local railways, some of which are narrow gauge. The regulations for such railways have previously varied from district to district, but the German Minister of Transport is now authorised to issue simplified regulations for the construction and operation of such lines. The Decree applies also in the Eastern Occupied Territories. Many of the local railways are regarded as of great importance in handling wartime traffic. The new regulations are understood to have been made with the object of facilitating a considerable increase in carrying capacity by the reconstruction of such lines to accommodate heavier axle loads, and their conversion to standard gauge where necessary.

The gauge conversion and modernisation of the Müglitz Valley branch line from Heidenau to Altenburg formed the subject of an illustrated article in THE RAILWAY GAZETTE for September 29, 1939, when we pointed out the strategic importance of this line in facilitating communications between Dresden and the pre-Munich Czechoslovak frontier. The work then described is typical of the intensive methods adopted by Germany in rehabilitating local railways for strategic needs.

Suspension of Malmö-Copenhagen Ferry Service

Due to an agreement between the Swedish and Danish State Railways, the ferry service between Malmö and Copenhagen was discontinued as from July 12. If special ferry passages are operated, in connection with goods traffic, the public is entitled to make use of them; neither registered luggage nor express goods, however, will be conveyed on such trips. According to Swedish information, the suspension has been caused by the 50 per cent. increase in the Malmö port dues. Normal passenger and goods traffic between Sweden and Denmark now is restricted to the ferry route Helsingborg—Elsinore, on which the number of services has been



Arrangements at Waterloo Station, Southern Railway, in connection with the compulsory taxi queue system introduced on September 20 (see accompanying paragraph)

increased. The ferry leaves Helsingborg at 8.50 a.m. and at 6 p.m., and passengers from Stockholm have to change trains at Helsingborg in order to reach the morning ferry and to arrive at Copenhagen at 12.29 p.m. Passengers using the day fast train from Stockholm change at Eslöf in order to catch the evening ferry and arrive at Copenhagen at 10.30 p.m. (on Sundays at 9.50 p.m.). Departure times for special trips between Malmö and Copenhagen are expected to be at 12.10 p.m. from Malmö and at 10.27 a.m. from Copenhagen. (See also issues of July 10, page 42; July 31, page 114; and August 28, page 210).

Swedish Transport Tax

The ticket tax in Sweden to which reference has been made from time to time in these columns was introduced on July 1. It takes the form of a 10 per cent. tax on all passenger fares and goods rates.

The Trans-Saharan Railway

Reports from Lisbon state that progress continues to be made with the Trans-Saharan (or Mediterranean-Niger) Railway, and that the section from Colomb Bechar to Beni Abbas is almost finished. Our previous reference to this railway was at page 511 of our April 24 issue.

Daylight Saving in South Africa

A daylight saving system, involving the advance of clocks by one hour, was brought into operation throughout the Union of South Africa on September 20. It is to continue until March 21, 1943.

Petrol Rationing in Argentina

Petrol rationing was introduced in Argentina from October 1 in order to ensure sufficient deliveries for harvesting. Private motorcar owners are to receive about 22 gal. a month.

Petrol Rationing in U.S.A.

Without waiting for the introduction of petrol rationing outside the 17 Eastern States where it is already in force, the Federal Price Administrator has appealed to all Americans to reduce their petrol consumption immediately. Several weeks may elapse before the printing and distribution of petrol ration books has been completed for the whole country. Eventually it is intended to give American motorists, who are stated to number about 20,000,000, approximately 5 gal. of petrol weekly. President Roosevelt has asked all motorists not to exceed 35 m.p.h.

Pacific Great Eastern Railway

A party of prominent citizens of Seattle recently toured the Pacific Great Eastern Railway, and one member stated that the United States was interested in the line as a connecting link in a projected railway to Alaska (see also July 3 issue, page 6 and August 28, page 210); it was stated that its purchase from the Government of British Columbia might be arranged. The Alaska Highway, which was under construction, should be supplemented by something more substantial; the latter would be important in the future both from military and commercial points of view. Another member expressed the opinion that funds for the purchase of the Pacific Great Eastern might be raised privately, but added that a great deal would depend on the price demanded by the Government of British Columbia, as the railways of the United States had heavy commitments. The party expressed interest in the fact that the Prime Minister of British Columbia, who was to have accompanied it, had gone instead to confer with officials of the railway and of the Department of Public Works; there was

speculation to the effect that this might have some bearing on the future of the railway.

Reduced Fares in Canada

Further steps have been taken recently to eliminate reduced fares on the railways of Canada, and in announcing them the Canadian Minister of Munitions & Supply stated that, unless unnecessary civilian travel were limited on a voluntary basis, even further restrictions would be needed. Some account of the restrictions imposed under an Order of June 26 were given at page 163 of our August 14 issue. Since then further restrictions have been imposed and from midnight on August 31 there have been no reduced fares on journeys between Eastern and Western Canada; on journeys between the Prairies and the Pacific Coast; and on trips made by convention groups. All such traffic is now carried at ordinary fares. This Order does not affect in any way travel at reduced rates by members of the armed Forces.

Canadian Railways in the Forces

On August 1 of this year no fewer than 11,645 employees of the Canadian Pacific Railway were on active service, and a further 1,156 were in the Reserve Army. This total of 12,801 comprised 21 per cent. of the total peacetime personnel of the C.P.R. system. Of the 5,715 in the Armed Forces, 2,399 are from Eastern lines, and 3,176 from Western lines; 140 enlisted in Europe and the East. Canadian Pacific Steamships has a record virtually equal to the railway in this respect, with 5,565 employees on active service. On Admiralty service are 4,484, and 1,010 are on company passenger ships now converted to armed cruisers; shore staff comprises 71. Canadian Pacific Express and Canadian Pacific Air Lines Limited have 365 on active service.

Indian Railway A.R.P.

The following is a brief outline of the Indian Railway Air Raid Precautions Service Rules, as published in a recent issue of *The Gazette of India*.

The rules extend to all railway and other areas in British India for which Railway A.R.P. Services have been or may be constituted under the R.A.R.P.S. Ordinance. They have already come into force.

In each area a Controller shall be responsible for the organisation of the service, for the enrolment, training and equipment of its personnel, and for the directing of the service. Each area may be divided or subdivided as the Controller may deem expedient, and the Controller may appoint one or more persons to be sub-controllers, who shall exercise, subject to the superintendence of the Controller, all or any of the powers of a Controller. The service shall consist of some or all of the following sub-services as may be added by the railway administration:

- (a) Wardens' Service.
- (b) Casualty Service.
- (c) Rescue Service.
- (d) Fire-watching & Stirrup Pump Party Service.
- (e) Fire-fighting Service.
- (f) Communications Service.
- (g) Anti-gas & Decontamination Service.
- (h) Bomb Reconnaissance & Confirmation Service.

The Controller, or a person authorised by him, shall determine the location of any posts or depots of these sub-services, and shall appoint the necessary members of these sub-services in such numbers as may from time to time be fixed by the railway administration. No person shall be appointed as a member of a service who is not considered physically fit and,

before appointment, every member who is not a railway servant shall sign a declaration stating that he will perform his duties and functions as a member of the R.A.R.P.S. to the best of his skill, ability, and knowledge, and that he will obey the lawful orders of his superior officers in the service. Every member of a service shall receive a certificate of membership. Loss of a certificate must at once be reported to the Controller through the member's immediate superior, and such certificate shall cease to have effect whenever the person named in it ceases to be a member of the service.

A member of a service shall be entitled to such pay and/or allowances as may be fixed from time to time by the railway administration.

The Controller, or any person authorised by him, may call out members of a service for training and duty, and they shall report at places in accordance with any scheme or set of instructions approved by the Controller, as and when he, or anyone else authorised by him, may direct by specified means, which may include warning by siren or otherwise. No member of a service having reported for duty shall relinquish it until specifically ordered to do so.

It shall be the duty of a member of a service to undergo training, to attend practices, and to carry out duties according to any scheme or instructions approved by the Controller for the protection of persons and property against hostile attack made from the air or otherwise, and at all times to obey any lawful orders given by him or any member appointed to an office of command in the service.

Every member of a service shall conform to the following regulations:

(1) He shall notify any change in his permanent address or place of employment.

(2) He shall not, except with the permission of the Controller, communicate with the press or any political organisation or body in regard to any matter connected with his duties in the service.

(3) He shall treat as strictly confidential all reports or copies thereof coming within his cognisance in the course of his employment as a member of the service.

Members of a service when on duty shall wear such uniform, armlets, and badges, and carry such equipment as directed; these are supplied free of cost by the railway administration, and they shall be returned when members leave the service. In the event of a member failing through negligence or misuse to return any article of equipment, or returning it in a damaged condition, he will have a sum fixed by the Controller recovered from him.

No member of a service shall be at liberty to resign his office or withdraw himself from his duties unless expressly allowed to do so in writing by the authority by which he was appointed. A member who is not a railway servant shall give that authority one month's notice of resignation, but the authority may accept the resignation without such notice if it thinks fit.

Any member of a service, who, in the opinion of the Controller or any other authority, fails to discharge satisfactorily his duties, or is guilty of misconduct in the discharge of his duties, or whose continued presence in the service is otherwise undesirable, is liable to summary dismissal in writing from the service.

The Port of London Authority

One of the many forms of organisation for transport undertakings which has its advocates is that of the public board or trust. Its supporters claim that this has the merit of being a compromise between public ownership and private commercial enterprise, and thus is truly a British body. The public board is usually a statutory body formed to take over existing organisations, and granted exclusive or monopolistic powers within certain clearly-defined areas or spheres of activity. Normally it is required to be financially self-supporting and is vested with the necessary powers to adjust its charges so as to achieve this.

One of the points about which there is the greatest divergence of opinion is that of the method of appointing the governing body, as it is generally assumed that the public board should be controlled by a body corresponding to a board of directors but not elected by the stockholders. Accordingly, it is of interest at the present time to consider the methods that have been adopted in the past for the appointment or nomination of members of the governing bodies of such statutory boards. One of the earliest of such organisations is the Port of London Authority, which has now functioned for 33 years.

The closing years of the 19th century found the London dock companies generally in an unsatisfactory financial position, and in 1899 the London & India Docks Joint Committee deposited a Bill in Parliament seeking powers to make a charge on barges that entered its docks for discharging or receiving goods, and to levy a toll on such goods. The Bill aroused considerable opposition and was rejected by the Government, but a Royal Commission was appointed in June, 1900, to enquire into the whole question of docks in the Port of London. In June, 1902, this Commission issued a comprehensive report recommending the creation of a new authority or public trust to take over and administer the property, powers, and obligations of all the dock companies, of the Thames Conservancy below Teddington, and of the Watermen's Com-

pany. A Bill to carry this into effect was introduced in Parliament in 1903, but abandoned.

Eventually the Port of London Act, 1908, was passed. It transferred the undertakings and powers of the dock companies to the Port of London Authority, which was described as a public trust to be operated for the public good somewhat on the lines of the governing bodies of the ports of Liverpool, Glasgow, Leith, Newcastle, and Belfast. The powers of the Thames Conservancy below Teddington were also transferred to the Port of London Authority, as were certain duties of the Watermen's Company. The Corporation of the City of London retained the sanitary supervision of the port as far as shipping was concerned; the Corporation of Trinity House retained its powers of lighting and buoying the river; and the Metropolitan Police continued to hold their responsibilities on the river. The quays, wharves, and warehouses belonging to the public wharfingers on the river remained independent undertakings.

The Port of London Authority consists of 28 members, 10 of whom are appointed and 18 elected. The 10 members are appointed:—

One by the Admiralty.

Two by the Ministry of War Transport (at first the Board of Trade, and subsequently the Ministry of Transport). One of these is appointed after consultation with organisations representative of labour.

Four by the L.C.C. (two are members of the Council, and two not members). One of the non-members of the L.C.C. is appointed after consultation with organisations representative of labour.

Two by the Corporation of the City of London.

One by Trinity House.

The 18 elected members are elected by the payers of rates, wharfingers, and owners of river craft.

The Port of London Authority has power to appoint a chairman and a vice-chairman, if desired from outside the membership of the authority.

One of the primary duties thrown upon the Port of London Authority was to improve the accommodation and facilities afforded in the port of London. It was therefore necessary to raise funds considerably in excess of the basic amount required for the purchase of the constituent undertakings. The authorised borrowing powers of the Port of London Authority are 45 million pounds. The amount exercised is approximately £41,700,000, but some of the stock has already been redeemed. The stocks are secured on the Port Fund and all revenues of the Port of London Authority, which may be required by the Ministry of War Transport to levy additional, or increase existing, rates in the event of insufficiency of revenues. Provision is made for redemption within 90 years of any Port stock.

DANUBE-SAVA-ADRIA RAILWAY.—Delegates of the Croatian, Hungarian, German, and Italian state railway systems, under the chairmanship of Senator Giannini, met in conference at Brioni (near Pola, to the south of Trieste) on August 10, to discuss the reorganisation, both financial and otherwise, of the Danube-Sava-Adria Railway Company (known as Südbahn up to the collapse of Austria-Hungary in 1918). The various sections of that railway were taken over by the countries in whose territories they had come to be situated, that is to say, Jugoslavia, Austria, Hungary, and Italy. Representatives of the committee of Südbahn debenture holders were also present at the conference. Complete agreement on all problems is said to have been reached, but no particulars have been issued.

Staff and Labour Matters

Clothing Coupons for Workers

The Board of Trade has decided to award 10 extra clothing coupons for the 1942-43 rationing period to a wide range of manual workers whose work imposes greater wear and tear on clothing than does sedentary or light work. The trades and occupations eligible for the extra coupons are set out in a leaflet G.O.S. 10 which has been issued by the Board of Trade.

The extra coupons are supplied to employers through the local offices of the Ministry of Labour & National Service, and the scheme places the responsibility on the employer for obtaining the coupons and distributing them to the workpeople. The Board of Trade is also examining the clothing needs of workers employed in certain exceptionally heavy trades.

Railway Wages

The claims of the National Union of Railwaysmen for an all-round increase of 10s. a week, and of the Associated Society of Locomotive Engineers & Firemen for increases ranging from 4s. to 12s. a week for drivers, motormen, firemen, and engine cleaners are to be decided by the Railway Staff National Tribunal. The claims were presented to the Railway Staff National Council on September 18, but agreement could not be reached on the claims and the council decided that they should be referred to arbitration before the Railway Staff National Tribunal.

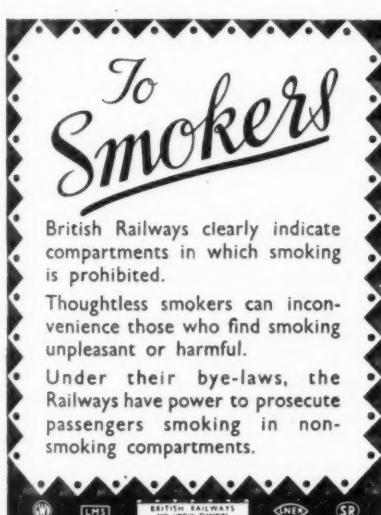
Engineering Wages

The trade unions represented in the National Engineering Joint Trades Movement have presented the following claims to the Engineering and Allied Employers' Federation: (1) All-round increase of 11s. a week. (2) 33½ per cent. increase on base rates for all plain time workers. (3) Restoration of pre-June, 1931, conditions. (That was when the world depression struck engineering).

The claim affects over 2,000,000 workers in the engineering industry.

RECORD CROPS FROM LINESIDE PLOTS.—The railways report that their embankment harvest is beating last year's records. Thousands of railway allotments have been let to members of the public in addition to railway employees. Altogether 78,000 lineside allotments covering 4,234 acres are under cultivation. Plots of 30 yards by 10 yards are being provided wherever the ground is suitable, and access can be obtained. To assist food supplies for workers' canteens the railways are also farming spare land and 600 tons of potatoes are being collected from the London Transport farms at Bushey and Aldenham, Northolt and Staines which have also produced 300 tons of green vegetables and 100 tons of root vegetables; this represents some 80 per cent. of the requirements of the staff canteens.

OFLAG VI B.—In our September 18 issue we made reference to the Institute of Transport study group of prisoners-of-war in this camp. It is announced since that Oflag VI B has been dissolved and that the prisoners are being transferred to new camps.



A warning poster recently issued by the railways

ABSTRACTS OF RECENT PATENTS*

No. 538,617. Superheaters

The Superheater Co. Ltd., of St. Margaret's Road, Bowdon, Altrincham, Cheshire. (Application dates: February 7, 1940, and May 14, 1940.) (A communication from Compagnie des Surchauffeurs, of 29, Rue de Berri, Paris, France.)

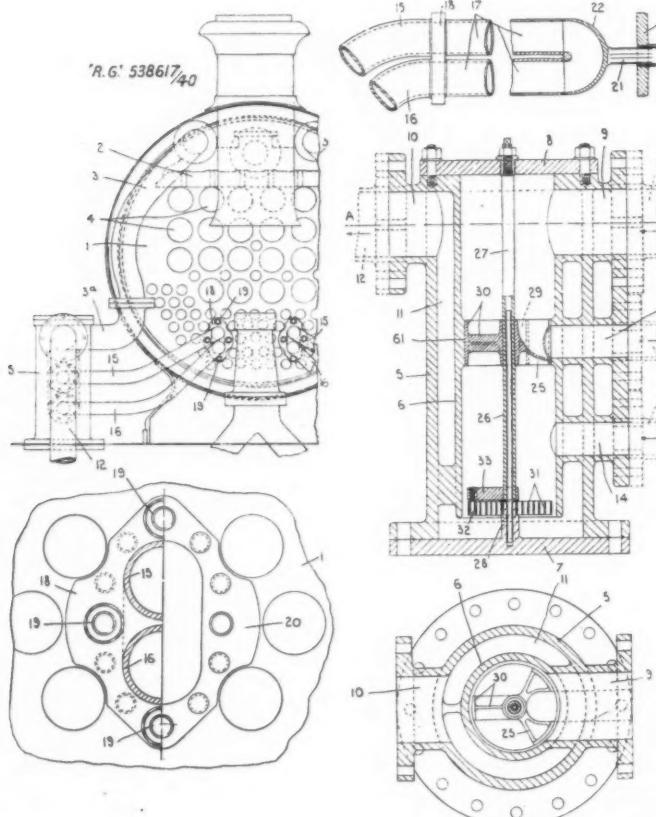
In a steam superheater and temperature controller, the steam pipes 3 lead from the superheated steam chamber of the superheater 2 to housings 5 each of which has a liner 6 and covers 7 and 8, neck 9 and elbow 3a connecting pipe 3 to liner 6, and neck 10, leading from space 11 between housing 5 and liner 6, and connected to pipe 12 leading to the valve chest. The superheater elements are located in enlarged smoke tubes 4. Also leading from the bore of liner 6 are ducts 13, 14 connected to pipes 15, 16 leading to a de-superheating element 17 supported in the

25 balances the latter. The face of the valve and the arm 30 are an easy working fit in facing 61 in the bore of the liner 6. To actuate the valve there is a thermostat 31 consisting of a bi-metallic spiral anchored to spindle 27 and connected to tube 26, and thus valve 25, by a peg 32 carried by an arm 33 fast with this tube. — (Accepted August 11, 1941.)

No. 539,734. Electric Motor Control

The British Thomson-Houston Co. Ltd., of Crown House, Aldwych, London, W.C.2. (Convention date: September 1, 1939.)

In a control system for a number of electric locomotive motors, for instance (as shown) four single phase A.C. motors of the series field commutator type, having armatures 10, 11, 12, 13 with interpole field windings 14, 15, 16, 17 and exciting field windings 18, 19, 20, 21, current

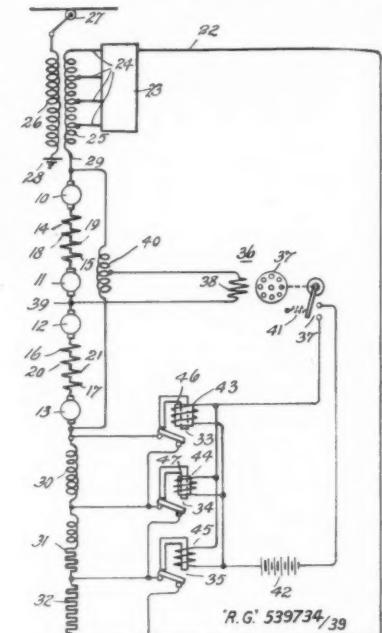


smoke box tube plate 1. Flange plate 18 is removably secured by studs and nuts 19 to a face plate 20. Extension 21 on the return bend 22 of element 17 supports the element; the extension slides in the bore of a thimble 23 in the fire-box tube plate 24. A valve 25 is mounted in the liner 6; this valve is fast with a tube 26 rotatable about a spindle 27 secured in cover 8 and journaled in a boss 28 on cover 7. Valve 25 controls steam entry to duct 13, and has wings 29 for this purpose. An arm 30 on the boss of valve

limiting impedances 30, 31, 32 are provided. These impedances are normally short-circuited by electromagnetically operated switches 33, 34, and 35 operated automatically by relay 36 in response to a predetermined speed difference between armatures 10, 11 and 12, 13 indicative of wheel slippage. One motor circuit terminal is connected by conductor 22 to a controller 23 for connecting conductor 22 to any one of taps 24 on the secondary winding 25 of a supply transformer with its primary winding connected to trolley

* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. The full specifications can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s.

27 and ground connection 28. The other motor circuit terminal is connected by conductor 29 to one terminal of secondary winding 25. The operating element of relay 36 consists of a single phase shaded pole induction motor with a squirrel cage rotor 37 and an operating winding 38 connected to point 39 between the two pairs of armatures and to the



middle of an auto-transformer or reactance coil 40 connected across the motor armature and field circuit. Relay 36 is controlled by a spring 41 to the predetermined speed difference. Rotation of rotor 37 when this speed difference occurs closes the circuit from an auxiliary D.C. source, such as a battery 42, for the coils 43, 44, 45 of switches 33, 34, 35. Switches 33, 34 have copper jackets 46, 47 on the magnet cores to delay closing of the switches. Impedance 30 is entirely reactance, impedance 31 has reactance and resistance, and impedance 32 is entirely resistance. — (Accepted September 22, 1941.)

COMPLETE SPECIFICATIONS ACCEPTED

538,137. Wedgwood & Sons Ltd., J., and Wedgwood, C. T. Tunnel trucks.

538,139. Moody, C. P. Sliding-doors.

538,173. Riley & Son Ltd., A. J., and Riley, J. S. Steam generators or boilers.

538,218. Aveling-Barford Limited, and Henderson, W. M. Power-tipping truck.

538,253. Briggs Manufacturing Company. Arm-rests for vehicle bodies.

538,285. Scheiding, J. T. D. M. Pistons and piston-rings for use in the cylinders of internal-combustion engines, steam engines, pumps, compressors, or the like.

538,322. Klipin, A. B. Cantilever supports for bodies of vehicles.

538,334. British Thomson-Houston Co. Ltd. Electric vehicle drive systems.

538,508. Sargeant, F. C. (trading as Sargeant & Company, E.). Seats for vehicles.

538,569. Linde Air Products Company.

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Methods and apparatus for the removal of scale from the surface of metal bodies.

538,617. Superheater Co. Ltd. (Compagnie des Surchauffeurs). Steam superheating apparatus for locomotives.

538,677. Celic Corporation Limited and Townsend, C. S. Solution for preventing boiler incrustation and the elimination of rust and corrosion and a method of preparing the same.

538,679. Oubridge, W. A. Piston and like packing rings.

538,933. McClean, H. G., and Crompton Parkinson Limited. Electrically-propelled vehicles.

539,246. Ramsden, H. K., Kettlewell, H. N. W., and Metropolitan-Vickers Electrical Co. Ltd. Control equipments for electric motors.

539,345. British Insulated Cables Limited, London Passenger Transport Board, Broom, T. C., and Powell, H. J. Overhead equipment of electric traction systems.

539,617. Tomlinson, A. V. (Union Switch & Signal Company). Railway-traffic controlling apparatus.

539,701. Wilcox, G. D. Power drive mechanism for a vehicle.

539,561. McNulty, D. Draught-inducing appliances for locomotives.

539,736. Wilcox, G. D. Power-driven mechanism for a vehicle.

companies amounted to 2,574,000 pesos (£154,440) instead of 1,723,000 pesos (£103,380), the sum due, a surplus of 851,000 pesos (£51,060). Altogether, the extra amount collected from the privately-owned railways during 1929 alone was 2,207,000 pesos (£132,420) in excess of the amount due; the excess sums collected by the fund up to 1928 inclusive had accumulated to over 20,000,000 pesos (£1,200,000). From 1930 onwards, due to the decline in the traffic receipts and a compulsory reduction in the tariffs, the railways were unable to continue to meet their obligations to the fund, to which at the end of 1941 they owed an aggregate sum of approximately \$60,000,000, but which they are unable to pay for the reasons stated.

The figures given in the report relating to the State Railways show that even during the period of greatest prosperity, between 1920 and 1928, and notwithstanding the 5 per cent. increase in tariffs authorised by the Government to enable the railways to pay their contributions into the fund, the State-owned lines were unable to comply with their obligations; the total amount owed by them at the end of 1941 was nearly \$20,000,000. Thus, the aggregate sum owing to the fund by all the State and privately-owned lines amounts to some \$80,000,000. Nor will the situation be relieved greatly by the recent increase in the tariffs, as it is estimated that the fund will only benefit thereby to the extent of about \$5,000,000 a year.

The memorandum quotes the pensions fund report for the year 1939, which referred to the pernicious effects upon the fund's

finances of the amending law No. 11308, passed in 1927, which increased the benefits to a degree which was neither sound nor justifiable, and without any corresponding increase in the contributions. As a result, from 1927 onwards the fund has been drifting gradually into insolvency. The memorandum states also that the efforts made at various times to augment the fund's resources by means of emergency measures have been merely palliatives which have left the roots of the trouble untouched. Proposals have been made for augmenting the income either by increasing the contributions from the railways and the employees or by an increase in the tariffs, or both these expedients together. But the report points out that to extricate the fund from its present predicament these increases would have to be on a scale impossible of application under the existing circumstances.

L.N.E.R. SALVAGE ORGANISATION.—To make certain that every scrap of waste material is saved, the L.N.E.R. has appointed in each of its departments a Chief Salvage Master, who will be responsible for organising and encouraging the work of salvage collection within the department concerned, and who will be assisted at every station, depot, dock, hotel, yard, and workshop by a Salvage Master. These appointments in no way supersede the company's very stringent salvage instructions, and are intended rather to seek and cut out the small waste which otherwise might be overlooked.

Argentine Railway Pension Law

The Argentine Railway Information & Publicity Bureau has issued a memorandum on the railway pension fund, based on an exhaustive analysis of the causes which have brought about the crisis in the fund's finances and to which frequent references have been made in our columns. The statistics it contains make it clear that unless drastic measures are taken to arrest the continuous and increasing drain on the capital of the fund, ultimate bankruptcy is inevitable. The report is divided into 7 sections dealing, respectively with the antecedents of the problem; the contributions from the railways; the effects of the economic crisis on the fund; the measures taken to arrest the loss on capital; various decisions of the Supreme Court as to the legal responsibilities of the railways in relation to the fund; the accumulation of annual deficits; and the immediate causes of the crisis.

The report points out that the present situation of the fund is due to various causes, some of which are inherent in the faulty actuarial basis on which the law was originally framed; but others are due to circumstances which have arisen since then, and which could not have been foreseen. Of these the economic crisis which arose in 1929 was the most serious and the most important.

Up to the year 1929, in the case of the British-owned railways, and up to 1931 as to those financed with French capital, the revenue derived by the fund from these companies in respect of their legal contributions of 8 per cent. on their salaries and wages bills was not only in conformity with the established quota but considerably exceeded it. For example, in 1929—the last year in which a surplus was recorded—the contribution due to the fund by the British-owned railways was 15,286,000 pesos (£917,160), but the amount paid in by them was 16,642,000 pesos (£998,520), or 1,356,000 pesos (£81,360) in excess of their legal obligations. During the same year the contributions received from the French

Finnish State Railways in 1940

The report of the Finnish State Railways for 1940 shows that receipts totalled 1,274,863,000 Finnish marks, compared with 1,150,571,000 Finnish marks in 1939, and with 1,113,344,000 Finnish marks in 1938. When comparing these and other financial figures, due allowance must be made, however, for the devaluation of the Finnish currency, which has taken place since 1938, and particularly since the first war with Russia, as well as for the 10 per cent. increase in rates and fares which came into force (with a few exceptions) on October 1, 1940.

The loss of part of the Finnish railway system as a result of the latter war is reflected in the notably lower goods receipts for 1940, which aggregated 734,767,000 marks, against 751,682,000 in 1939; on the other hand, the movement of the population in connection with the evacuation of the territory ceded to the Soviet Union and its settlement in other areas were responsible for a considerable increase in passenger receipts.

Full particulars of receipts for 1940, with comparative figures for 1939 and 1938, are shown in the table below.

Total expenditure aggregated 998,900,000 Finnish marks, compared with 939,900,000 in 1939. The working ratio improved

from 81.7 per cent. in 1939 to 78.36 in 1940.

An agreement was concluded in Moscow on September 6, 1940, by which new through rates and fares were fixed; these became effective on October of that year. A number of reductions of goods rates, particularly in respect of single-trade firms, were accorded during the course of 1940, affecting mainly the conveyance of timber, scrap, iron, paper, rags, limestone and lime for fertilising purposes, wooden houses and components thereof, cellulose, foodstuffs, clothing, agricultural implements and industrial tools, and cattle; these largely concerned the supply of the frontier dwellers, who had lost all their belongings and who had to be assisted in their new areas.

As the result of depreciation and amortisation, the invested capital of the Finnish State Railways was reduced from 5,914,900,000 Finnish marks at the end of 1939 to 5,719,400,000 Finnish marks at the end of 1940.

The number of staff employed decreased from 32,018 at the end of 1939 to 31,006 at the end of 1940; of these figures, permanent staff accounted for 13,361 and 12,897, auxiliary personnel for 4,067 and 4,871, and regular labour for 14,590 and 13,238, respectively. The reductions also are partly due to the cession of part of the Finnish railway system to the Soviet Union.

	1940	Percentage inc. or dec.	1939	1938
Passenger traffic ...	469,940	+36.86	333,765	297,874
Goods traffic ...	734,767	-2.25	751,682,000	750,211
Other traffic receipts ...	10,022	+0.78	9,207	10,044
Telegraph services ...	873	+0.09	618	487
Road motor services ...	10,150	+0.79	8,500	8,661
Postal services ...	17,560	+1.38	17,260	17,150
Miscellaneous receipts ...	31,548	+2.47	29,537	28,914
	1,274,863	—	1,150,571	1,113,344

(Receipts are given in thousands of Finnish marks)

Notes and News

Imperial Chemical Industries Limited.—Interim dividend of 3 per cent. on the ordinary stock in respect of the year 1942, being the same as a year ago. The dividend will be paid (less tax at the standard rate reduced by Dominion relief at 8d. in the pound) on December 1.

Cost-of-Living Index.—On September 1 the official cost-of-living index figure was 100 points above the level of July, 1914, compared with 101 points a month earlier. For food alone the index figure remained unchanged at 60 points above the level of July, 1914.

San Paulo (Brazilian) Railway Co. Ltd.—The directors have declared an interim dividend on account of 1942 of 2½ per cent., less tax, on the 5 per cent. non-cumulative preference stock. Warrants will be posted on October 21. Consideration of any dividend on the ordinary stock is deferred until the year's accounts are completed.

Westinghouse Ticket Machine Co. Ltd.—At an extraordinary general meeting of this company, held at Public Trustee Office, Kingsway, London, on September 15, a resolution was passed as a special resolution that the company be wound up voluntarily and that Mr. Russell Kettle, of 5, London Wall Buildings, E.C.2, Chartered Accountant, be appointed Liquidator for the purposes of such winding up.

The Argentine-Bolivian Railway.—The first sleeper of the Argentine-Bolivian international railway, from Yacuiba to Santa Cruz, was laid at Yacuiba on September 4, in the presence of President Castillo of Argentina and President Peñaranda of Bolivia. A commemorative monolith was unveiled. An oil pipeline linking the Bolivian oilfields to the Argentine railway system has been laid, and the first oil was pumped through on September 4.

Engineer Officers Required.—Men aged up to 41 are wanted for direct commissions in the Army as Engineer Officers (ungraded). These men must have served at least three years' apprenticeship with a recognised engineering firm and have held a responsible position in the engineering industry. Application should not be made by engineers with technical qualifications of Higher National Certificate or above. Details are given in our Official Notices, at page 335.

Posen Tramways.—Posen (Poznan) had the fourth largest tramways system in Poland at the outbreak of the present war. It is believed that the rolling stock of the Posen tramways was either destroyed or damaged beyond repair in the course of the early fighting. A recent report from a German source says that a fleet of tramways, both motorcars and trailers, which had previously been in service in a Rhine-land town, has now been transferred to Posen. The route length of the Posen tramways is 31 km. (19 miles), and the pre-war fleet comprised 214 trams, of which 98 were trailers.

Great Northern Railway Company, U.S.A.—Average mileage operated in 1941 was 8,071. Railway operating revenues were \$125,044,883 (\$101,743,146) and total operating expenses advanced from \$65,901,723 to \$78,323,366, giving an operating ratio of 62.6 per cent., against 64.8 per cent. Net railway operating income amounted to \$28,001,535, an increase of \$6,194,471, and the total income was

\$6,602,582 higher, at \$31,627,785. Fixed charges absorbed \$13,915,920, leaving a net income of \$16,785,159, which was \$6,576,965 better than that for 1940.

Polish Tramways.—At the time of the German invasion of Poland in 1939, 11 Polish towns possessed tramway systems. They were as shown in the following list, which is arranged in decreasing order of the route mileage of the respective systems: Warsaw, Lodz, Lwow, Poznan, Krakow, Torun, Bydgoszcz, Grudziadz, Bielsko-Biala, Inowroclaw, and Tarnow.

Dublin Port & Docks Board.—The Dublin Port & Docks Board election, due to be held next January, will not take place. By an Order under the Emergency Powers Act, the Government of Eire has postponed it until January, 1944, and has extended the term of office of the present executive members of the board. Due to circumstances arising out of the present emergency, the board requested the Minister for Industry & Commerce to grant the postponement. The election which was due to be held last January was postponed in similar circumstances.

Dorada Railway (Ropeway Extension) Limited.—Gross revenue in 1941 was £29,888 (£32,749) and expenses £39,685 (£41,698), leaving a loss on working of £9,797 (£8,949). Other outgoings, including £961 loss on exchange, brought the total loss to £11,307, which was reduced to £6,886 by refunds of Colombian and U.K. taxation. Adding debit balance of £15,543 brought in makes the total debit balance carried forward £22,429. The traffic hauled was 30,764 tons (36,516). Considerable rope repairs were necessary, but when new ropes are placed in service it is hoped some reduction in expenses will be possible.

Hamburger Hochbahn A.G.—This concern, combining the Hamburg elevated railways, tramways, bus, and other transport services, returned improved financial results for 1941. Receipts from the Hochbahn services proper totalled RM. 15,870,000, compared with RM. 14,560,000 in 1940; and tramway receipts aggregated RM. 40,120,000, against RM. 36,190,000 in 1940. On the other hand, receipts accruing from the curtailed motor services were lower at RM. 2,540,000 (RM. 2,850,000 in 1940); other transport receipts totalled RM. 1,960,000 (RM. 1,870,000 in 1940), and ancillary services yielded RM. 350,000, against RM. 280,000 in 1940.

Fuel Economy in Industry.—Reports are being received by the Fuel Efficiency Committee of the Ministry of Fuel & Power showing what a number of firms have done to secure greater efficiency in the use of fuel. Prospects of economy throughout industry are indicated by the work of the Ministry's Regional Fuel Efficiency Committees. These Committees consist of panels of qualified engineers who are making visits to factories throughout the country and advising how economies can be made. The engineers in one industrial region have visited 76 firms whose individual consumptions are over 2,500 tons a year. In the first 50 firms visited it was found that, without any major alterations of the plant, the possible savings are 72,500 tons a year out of a total consumption of 775,000 tons. One large firm, which has always paid great attention to fuel economy has, since the war, spent £13,750 on new plant and has thus saved 9,000 tons of coal a year. A group of hotels, operated by a railway company, reduced winter consumption of coal by 221 tons a month, or 21 per cent. The same company has reduced the con-

sumption of process steam in one of its locomotive works by a third.

Southern Railway Company, U.S.A.—Railway operating revenues in 1941 amounted to \$139,926,434, an increase of \$34,021,039, and the operating expenses of \$88,547,313 were \$15,677,132 higher, reducing the operating ratio from 68.81 per cent. to 63.28 per cent. Net railway operating income was \$11,332,687 higher, at \$32,789,981, and the total income of \$35,669,611 showed an improvement of \$11,494,146. Net income, after providing for rent for leased roads and equipment,

British and Irish Railway Stocks and Shares

Stocks	Highest 1941	Lowest 1941	Prices	
			Sept. 25, 1942	Rise/ Fall
G.W.R.				
Cons. Ord. ...	43½	30½	47½	—
5½ Con. Pref. ...	109½	83½	107	—
5½ Red. Pref. (1950) ...	105½	96½	105	—
5½ Rt. Charge ...	129½	116	125½	—
5½ Cons. Guar. ...	128	110½	123	—
4½ Deb. ...	113½	102½	109	—
4½ Deb. ...	115	105½	110½	—
4½ Deb. ...	121½	112	115½	—
4½ Deb. ...	132	122	127½	—
2½ Deb. ...	70	62½	75½	—
L.M.S.R.				
Ord. ...	17½	11	23½	+ ½
4½ Pref. (1923) ...	53	33½	58	+ ½
4½ Pref. ...	68½	48½	74	+ ½
5½ Red. Pref. (1955) ...	97½	77	99½	—
4½ Guar. ...	100	85½	99	—
4½ Deb. ...	105½	97	104	—
5½ Red. Deb. (1952) ...	110½	106½	109½	—
L.N.E.R.				
5½ Pref. Ord. ...	3½	2½	5	+ ½
4½ Deb. Ord. ...	2	1½	3	+ ½
4½ First Pref. ...	52½	33	56½	+ ½
4½ Second Pref. ...	19½	10	25½	+ ½
5½ Red. Pref. (1955) ...	79½	52	89½	+ ½
4½ First Guar. ...	90½	74½	92	—
4½ Second Guar. ...	80½	59	84	+ ½
3½ Deb. ...	79½	68½	79	—
4½ Deb. ...	104	91½	103	—
5½ Red. Deb. (1947) ...	106	102½	104½	—
4½ Sinking Fund ...	103½	99½	103½	—
Red. Deb. ...				
SOUTHERN				
Pref. Ord. ...	65½	43½	69	+ ½
Def. Ord. ...	15½	9	18½	+ ½
5½ Pref. ...	107	77½	105	—
5½ Red. Pref. (1964) ...	107	89½	107	—
5½ Guar. Pref. ...	128	111	123	—
5½ Red. Guar. Pref. (1957) ...	114½	107½	110½	—
4½ Deb. ...	112	102½	107½	—
5½ Deb. ...	130½	119	126½	—
4½ Red. Deb. (1962-67) ...	108½	102	108½	—
4½ Red. Deb. (1970-80) ...	108½	102½	108	+ ½
FORTH BRIDGE				
4½ Deb. ...	99½	90½	107	+ 2
4½ Guar. ...	99	85½	103½	—
L.P.T.B.				
4½ "A" ...	120½	109½	115½	+ 1
5½ "A" ...	130½	115½	124½	+ 1
4½ "T.F.A." ...	103½	99½	100	—
5½ "B" ...	117	102	114½	—
"C" ...	46½	28½	48	—
MERSEY				
Ord. ...	24½	19½	23	—
3½ Perp. Pref. ...	58	51½	59	—
4½ Perp. Deb. ...	100	90	99	—
3½ Perp. Deb. ...	73½	63	77	—
IRELAND				
BELFAST & C.D.				
Ord. ...	4	4	9	—
G. NORTHERN				
Ord. ...	14½	3	23	—
G. SOUTHERN				
Ord. ...	14½	5	15	—
Pref. ...	17	10	21	+ ½
Guar. ...	44	16	44	+ ½
Deb. ...	61	42	63	+ ½

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Monday. All advertisements should be addressed to: *The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

interest on funded debt, and other deductions, amounted to \$19,369,894, an increase of \$2,017,822.

Parkgate & Aldwarke Station.—The L.N.E.R. has announced that Parkgate & Aldwarke Station will be closed on Sundays, as from October 5. This station is on the former Great Central line, between Rotherham and Doncaster.

Aircraft Crashes on Railway.—A British aeroplane crashed on the L.M.S.R. main line between Berkhamsted and Bourne End, Hertfordshire, on September 23. Some of the sleepers are stated to have been burned. Certain trains had to be diverted over a period of several hours.

U.S. Railway Accident.—It is reported that an express train from Detroit to Washington on September 24 came into collision with a Cleveland-Washington express near Dickerson, Maryland, after the latter had stopped to repair an air-pump. Some coaches struck a fast goods train which was passing. Six persons are stated to have been killed, and some passengers were trapped among the wreckage.

Italian Motor Roads.—As a result of the drastic curtailment of civilian motor traffic in Italy by reason of the shortage of motor fuel and tyres, the Italian motor road companies without exception have incurred substantial financial losses in 1941. The Società Anonima Autostrada Torino-Milano, owning the longest Italian motor road (Turin-Milan, 126 km.) sustained a loss of Lire 1,580,000 in 1941, compared with losses amounting to Lire 479,900 and Lire 954,200 in 1940 and 1939 respectively. The unfavourable balance was thus increased to Lire 15,300,000. The company's share capital is Lire 29,700,000. The motor road company Venezia-Padova Società Anonima, owning the motor road between

MEN wanted for direct commissions in Army as Engineer Officers (ungraded), aged up to 41. Must have served at least three years' apprenticeship with a recognised engineering firm of some standing and held responsible position in Engineering Industry. Engineers with technical qualifications of Higher National Certificate or above should not apply. Applications in writing, giving full particulars and name and address of present employer, to W. N., c/o Charles Barker & Sons, Ltd., 31, Budge Row, London, E.C.4.

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Venice and Padua, reported a loss of Lire 710,000 for 1941. The company's share capital is Lire 7,000,000. The only motor road company which had returned a profit in 1940, the Società Anonima Autostrade Meridionali, of Naples, also incurred a loss in 1941; this amounted to Lire 68,000, compared with a profit of Lire 22,000 in 1941. The company, which has a share capital of Lire 20,000,000, owns the motor road between Naples, Pompeii, and Castellammare di Stabia.

London Transport Stock Regulations.—Further regulations, entitled London Transport Stock (Amendment) Regulations, 1942, have been made by the Minister of War Transport modifying the provisions of the London Transport Stock Regulations, 1933. The principal amendments are the abolition of the right to have any of the stock of the board inscribed and the inclusion of certain provisions for matters of detail in connection with the forthcoming redemption of the "T.F.A." stock.

Canadian National Railways.—Gross earnings during August last were \$34,419,000, an increase of \$8,610,072 over August, 1941, and operating expenses were \$26,241,341, an advance of \$5,604,145, leaving net earnings \$3,005,927 higher, at \$8,177,658. Aggregate gross earnings for the eight months from January 1, 1942, were \$236,967,000, an increase of \$43,787,142, as compared with the similar period of 1941, and the net earnings of \$53,928,676 showed improvement of \$11,732,422.

Köln-Bonner Eisenbahnen A.G., of Cologne.—This company's passenger and goods receipts attained a record level in 1941, but expenditure also showed a considerable increase. The share capital of RM. 19,500,000 is owned, in the main, by the Cologne municipality and by the

administrations of Cologne and Bonn provinces. The company owns and operates the 32 km. (20 miles) Cologne-Brühl-Bonn line along the bank of the Rhine (electric traction), and the steam-operated line between Cologne-Sülz and Berrenrath, 12 km. (7 miles) long.

Contracts and Tenders

A Reuters message from Mexico City reports that 4,000 goods wagons, built in the United States for the Mexican Railways, will be delivered next month.

The Bengal-Nagpur Railway has placed an order with Guest, Keen & Nettlefolds Limited for a quantity of split pins.

The following orders have recently been placed by the Egyptian State Railways:—

P. & W. MacLellan Limited: Round steel bars, and mild-steel plates.

Stewarts and Lloyds Limited: Steel tubes, and superheater flame tubes.

Guest, Keen & Nettlefolds Limited: Screws.

Siemens Bros. & Co. Ltd.: Special screw.

Davis & Timmins Limited: Screws.

British Iron & Steel Corporation: Steel for snaps.

Pickford Tool Co. Ltd.: Taps.

British Thompson-Houston Co. Ltd.: Relay contacts.

Silvertown Lubricants Limited: Wagon axle grease.

Callender's Cable & Construction Co. Ltd., and W. T. Henley's Telegraph Works Co. Ltd.: Cable.

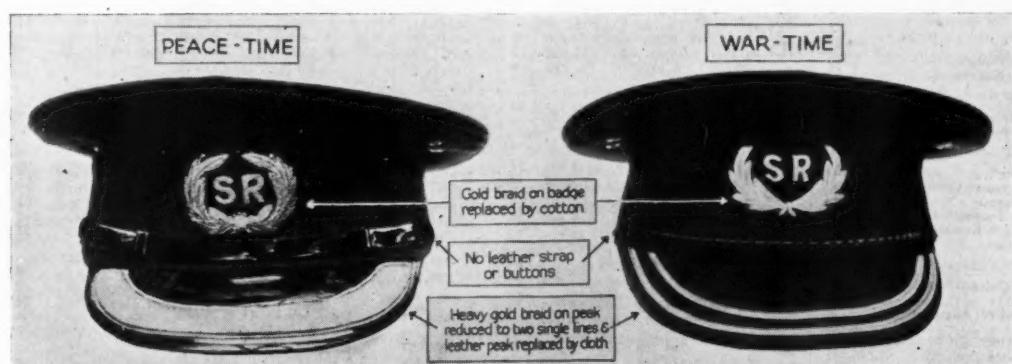
Thos. De La Rue & Co. Ltd., and Bullers Limited: Insulators.

W. T. Glover & Co. Ltd.: Cables.

Turret Grinding Wheel Co. Ltd., and the Carborundum Co. Ltd.: Grinding wheels.

Chance Bros. & Co. Ltd., and Pilkington Bros. Ltd.: Glass panes.

Joseph Tomney & Sons Ltd.: Gauge glasses.



Stationmasters on the Southern Railway are losing their peacetime gold braided caps, but the "austerity" cap is still smart though it saves a lot of essential material. Above are shown the old and new caps

October 2, 1942

Railway Stock Market

Although there has been no sustained increase in Stock Exchange business, the general undertone has been firm. In many directions sentiment was assisted by indications of the weight of money awaiting investment and by the belief that many securities are likely to remain in small supply in the market. There was a tendency to higher prices in British Funds, under the lead of 3½ per cent. War Loan. In most sections of the market, however, demand centred not so much on high-grade investments, as on smaller-priced and high-yielding securities, and in accordance with this tendency, in the home railway section, buying was confined mainly to the junior stocks. Consequently, the latter have shown further improvement in price, but nevertheless, yields continue to have an attractive appearance when compared with those ruling in other departments of the Stock Exchange. Apart from the question of current yields, however, sentiment has also been assisted by the increasing belief in the market that in any post-war reorganisation of transport, dividend prospects of the junior stocks should at least compare satisfactorily with their experience during the war period. Moreover, it is pointed out that the existing rental agreement is expected to run for at least one

year after the termination of the war, and may very well remain in force until it is possible to arrive at a final decision on post-war transport problems. These and similar views explain the wider attention which is being given to the attractive yields ruling on home railway junior stocks. The preference stocks of both the L.M.S.R. and the L.N.E.R. and the guaranteed stocks of the latter, as well as Southern preferred, have also continued in better demand at the time of writing, and they were higher on balance; it is believed that a good proportion of the demand has been on the part of investors prepared to regard these stocks as investments of a permanent character. In some quarters of the market there is continued talk of the possibility of slightly better dividends for the current year on L.M.S.R. ordinary and also on L.N.E.R. second preference; but these hopes are not being generally entertained at the present time, it being felt that it seems unlikely any increases in dividend would be made unless there were prospects of them being maintained during the war period.

Compared with a week ago, Great Western ordinary showed further improvement from 47½ to 48; the guaranteed and preference stocks were unchanged at 123 and 107 respectively, and the 4 per cent. debentures were again 109. L.M.S.R. ordinary remained in favour, and on balance, has further improved from 23 to 23½; the senior and 1923 preferences at

74 and 59 respectively, were both better, the latter showing a gain of 1½ points on balance. On the other hand, L.M.S.R. guaranteed remained at 99. Partly owing to talk of the possibility of the payment for the year being raised slightly to 2½ per cent., L.N.E.R. second preference has moved up to 25½, a gain of a point as compared with a week ago. L.N.E.R. first preference improved from 56 to 57, the first guaranteed from 92 to 92½ and the second guaranteed from 83½ to 84. This railway's 5 per cent. 1955 preference held its recent rise to 89½. Among Southern issues, main activity also centred on the junior stocks, and the deferred further improved on balance from 18½ to 19, while the preferred was 69½, compared with 69 a week ago; on the other hand, the guaranteed was again 123, the preference 105½, and the 4 per cent. debentures 108. London Transport prior charges remained firm; the "C" stock was slightly easier at 47½, but later rallied to 48.

Only small movements were shown in Argentine railway securities the disposition being to await the annual results and statements. Fractional gains were recorded in various ordinary stocks, while B.A. Gt. Southern 4 per cent. debentures were better at 56. Elsewhere, United of Havana debentures were higher at 25½ in response to the traffic position, and Leopoldina debentures had a firmer appearance at 47½. Canadian Pacifics were inclined to improve.

Traffic Table and Stock Prices of Overseas and Foreign Railways

Railways	Miles open 1941-42	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffics to date		Shares or Stock	Prices					
			Total this year	Inc. or Dec. compared with 1941		Totals			Increase or Decrease	Highest 1941	Lowest 1941	Sept. 25, 1942		
						This Year	Last Year							
South & Central America														
Antofagasta (Chili) & Bolivia	834	20.9.42	£ 19,830	+ 3,640	38	£ 790,960	£ 704,490	+ 86,470	Ord. Stk.	10½	3½	11 Nil		
Argentine North Eastern	753	19.9.42	14,568	+ 1,512	12	159,618	145,362	+ 14,256	6 p.c. Deb.	4	1	5 Nil		
Bolivar	174	Aug., 1942	3,790	- 60	34	35,191	30,717	+ 4,474	Bonds	5	5	12½ Nil		
Brazil	...	...	—	—	—	—	—	—	Ord. Stk.	7½	1½	5 Nil
Buenos Ayres & Pacific	2,807	19.9.42	93,000	+ 20,700	12	491,680	933,060	+ 58,620	Ord. Stk.	10½	3½	16 Nil		
Buenos Ayres Great Southern	5,080	19.9.42	142,920	+ 9,000	12	1,480,320	1,464,600	+ 15,720	Ord. Stk.	10½	3½	8½ Nil		
Buenos Ayres Western	1,930	19.9.42	51,540	+ 4,260	12	571,980	555,840	+ 16,140	Ord. Stk.	9	2½	7½ Nil		
Central Argentine	3,700	19.9.42	129,843	+ 13,053	12	1,440,639	1,283,316	+ 157,323	Ord. Stk.	8½	2½	6½ Nil		
Do.	...	...	—	—	—	—	—	—	Dfd.	9½	1	3½ Nil
Cent. Uruguay & M. Video	972	19.9.42	20,708	+ 346	12	232,703	255,023	- 22,323	Ord. Stk.	9½	1	5½ Nil		
Costa Rica	262	July, 1942	12,761	- 11,815	52	12,761	24,576	- 11,815	Stk.	15½	1½	13½ Nil		
Dorada	70	Aug., 1942	19,930	+ 7,480	35	118,405	100,750	+ 17,655	1 Mt. Stk.	97	97	88½ Nil		
Entre Rios	808	19.9.42	21,234	+ 2,538	12	207,858	216,630	- 8,772	Ord. Stk.	6½	½	5½ Nil		
Great Western of Brazil	1,030	19.9.42	11,300	+ 3,000	38	376,000	335,700	+ 40,300	Ord. Stk.	11½	1	1 Nil		
International of Cl. Amer.	794	June, 1942	\$115,937	- 85,230	25	\$844,687	\$673,300	+ \$171,387	1st Pref.	8	6d.	1½ Nil		
Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	8	6d.	1½ Nil		
La Guaira & Caracas	224	Aug., 1942	9,825	+ 1,245	33	54,765	51,825	+ 2,940	Ord. Stk.	9½	1	5½ Nil		
Leopoldina	1,918	19.9.42	29,936	+ 977	38	1,131,351	960,607	+ 161,744	Ord. Stk.	4	½	4½ Nil		
Mexican	483	14.9.42	ps. 237,900	- ps. 63,900	12	ps. 3,139,900	ps. 3,361,600	- ps. 221,700	Ord. Stk.	4	½	4½ Nil		
Midland of Uruguay	319	July, 1942	11,961	+ 2,549	4	11,561	14,510	+ 2,549	Ord. Stk.	6½	½	1½ Nil		
Nitrate	382	15.9.42	7,078	+ 2,354	23	132,196	101,153	+ 31,043	Ord. Stk.	66½	1½	68½ 12½ Nil		
Paraguay Central	274	18.9.42	\$3,799,000	+ 885,000	12	\$43,923,000	\$40,456,000	+ \$3,467,000	Pr. Lt. Stk.	43	29	47½ 12½ Nil		
Peruvian Corporation	1,059	Aug., 1942	85,805	+ 14,147	9	165,606	137,208	+ 28,398	Pr. Lt. Stk.	6½	1½	14½ Nil		
Salvador	100	July, 1942	c 79,000	+ c 14,921	4	c 79,000	c 64,709	+ c 14,921	Ord. Stk.	52	24½	53 3½ Nil		
San Paulo	153	13.9.42	37,876	+ 5,776	—	1,342,611	1,371,908	+ 29,297	Ord. Stk.	1	6½	1½ Nil		
Talat	160	Aug., 1942	5,235	+ 750	8	11,725	9,165	+ 2,560	Ord. Stk.	2½	½	4½ Nil		
United of Havana	1,346	19.9.42	34,931	+ 15,328	12	451,482	231,038	+ 220,444	Ord. Stk.	—	—	— Nil		
Uruguay Northern	73	July, 1942	1,137	+ 220	4	1,137	1,357	- 220	—	—	—	— Nil		
Canada	23,562	21.9.42	1,649,600	+ 379,200	38	52,076,400	42,368,400	+ 9,708,000	Ord. Stk.	—	—	— Nil		
Canadian National	...	...	17,049	+ 1,053,800	38	36,017,400	30,486,200	+ 5,531,200	Ord. Stk.	13½	7½	11½ Nil
India	Barsi Light	202	July, 1942	23,685	+ 8,903	17	63,285	67,635	- 4,350	Ord. Stk.	—	—	— Nil	
Bengal & North Western	2,090	July, 1942	261,600	+ 5,267	18	1,080,300	1,092,128	- 11,828	Ord. Stk.	345	253	349 5½ Nil		
Bengal-Nagpur	3,267	20.6.42	284,100	+ 31,301	11	2,271,525	2,107,876	+ 163,649	Inc. Deb.	101	95½	96 4½ Nil		
Madras & Southern Mahratta	2,939	30.6.42	212,550	+ 3,338	13	1,945,373	1,858,969	+ 86,404	Inc. Deb.	105½	101½	100 7½ Nil		
Rohilkund & Kumaon	571	July, 1942	58,275	+ 3,099	18	234,300	272,651	- 38,351	Inc. Deb.	342	290	351½ 4½ Nil		
South Indian	2,402	20.6.42	179,171	+ 43,616	12	1,376,295	1,113,057	+ 263,238	Inc. Deb.	100	87	97 4½ Nil		
Various	Beira	204	July, 1942	71,494	+ 3,483	20	743,603	—	—	Pr. Sh.	—	—	— Nil	
Egyptian Delta	607	10.8.42	11,442	+ 3,483	20	139,046	89,984	+ 49,062	Pr. Sh.	1½	29½	3½ Nil		
Manila	—	—	—	—	—	—	—	—	B. Deb.	68	45	37½ 9½ Nil		
Midland of W. Australia	277	July, 1942	27,869	+ 9,221	52	27,869	18,648	+ 9,221	Inc. Deb.	90½	86½	89½ 6 Nil		
Nigerian	1,900	25.7.42	50,391	+ 19,240	18	924,271	910,357	+ 13,914	—	—	—	— Nil		
Rhodesia	2,442	July, 1942	525,348	+ 21,840	16	4,831,449	—	—	—	—	—	— Nil		
South Africa	13,291	11.7.42	799,318	+ 366,183	37	11,228,057	10,722,623	+ 505,434	—	—	—	— Nil		
Victoria	4,774	Mar., 1942	1,339,304	+ 366,183	37	10,425,476	8,391,343	+ 2,034,133	—	—	—	— Nil		

Note. Yields are based on the approximate current prices and are within a fraction of $\frac{1}{2}$ per cent. calculated at 16½ pesos to the £.

Argentine traffics are given in sterling.

↑ Receipts are calculated at 1s. 6d. to the rupee.

§ ex dividend

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